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A Monthly Review of Veterinary Science.

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Annual Subscription for the British Empire, 12s. Post Free; for the United States, $3.00.

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BAILLIÈRE, TINDALL & COX,
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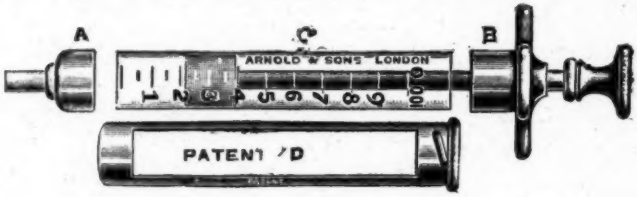

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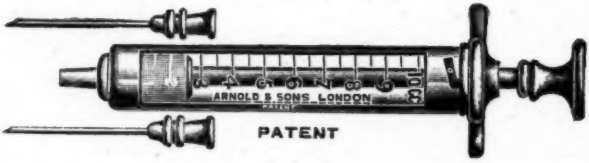

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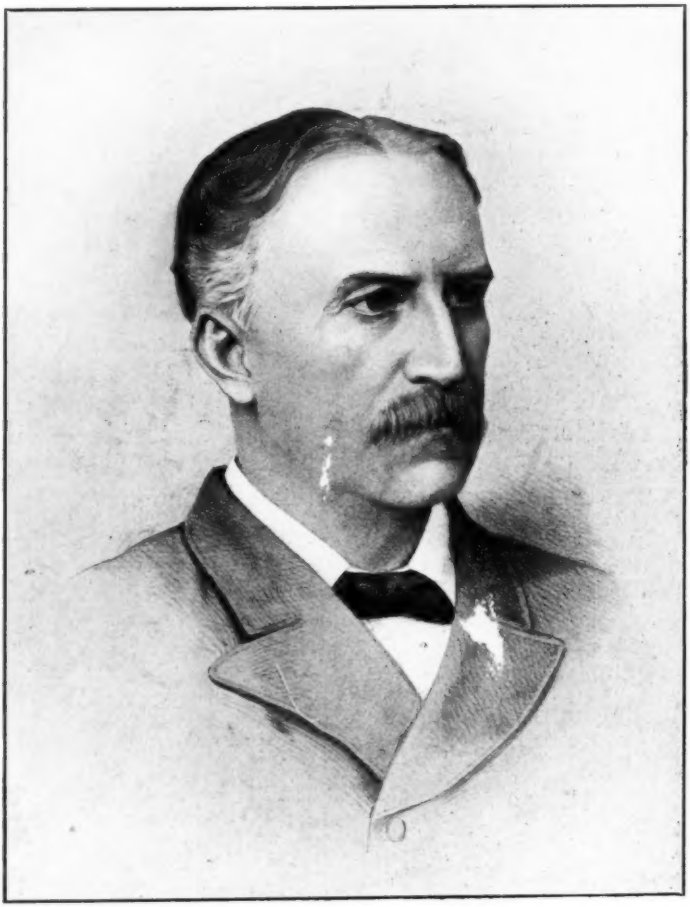


Yours faithfully
Wortley Axe

THE

VETERINARY JOURNAL

JANUARY, 1910.

THE LATE PROFESSOR J. W. AXE, M.R.C.V.S.

THOSE of our readers who knew Professor John Wortley Axe will be very sorry indeed to hear of his death, which took place at Winthorpe Lodge, near Newark, Notts, on Wednesday, December 15, 1909. Professor Axe had been in very ill-health for several years, and had in consequence been compelled to give up active professional work, so that many of · were not surprised although the end was sudden.

John Wortley Axe took his diploma at the Royal Veterinary College, London, in 1866, and was appointed to the teaching staff of his *Alma Mater* in 1869. He was very highly appreciated as a teacher, and soon won the affectionate regard of his students, who, after qualifying, frequently took advantage of his knowledge, skill, and tact for consultations. He was a good surgeon and fearless operator, and in the realms of medicine did excellent work in connection with anthrax, and abortion in cows. He discovered a small strongyle in the stomach-wall of the horse, and the parasite is now known as *Strongylus Axei*. Professor Axe resigned his professorial chair in 1893 and devoted himself principally to consultations, in which connection he was in great demand until his health failed. One of his latest contributions was a paper on Anthrax presented to the National Veterinary Association Meeting at Windermere in 1903. He was Veterinary Consultant to, and Member of, the Council of the British Dairy Farmers' Association; and for many years a member of the Council of the Royal College of Veterinary Surgeons, of which body he was President for the year 1889-90.

Indexed B. A. I.

Editorials.

THE TREATMENT OF RED WATER IN CATTLE.

ELSEWHERE in this issue of the VETERINARY JOURNAL we reprint an abstract of a very instructive series of experiments carried out by Professor Nuttall, of Cambridge, and Dr. Hadwen, of the Canadian Department of Agriculture, on the treatment of piroplasmosis of cattle with a dyestuff known as trypanblua. These workers some little time ago used this agent, and proved its usefulness for piroplasmosis of dogs. Their conclusions have been confirmed by Jowett, working independently in South Africa, an account of whose work we published in our last month's issue. The success met with in dogs has led the primary investigators to go further and apply similar measures to cattle affected with piroplasmosis, and the results are certainly encouraging. The common disease due to this class of parasites in Great Britain and America is red water, so we specially desire to draw the attention of country practitioners to this line of treatment, which, at any rate, is based on a good experimental footing. Up to this, the curative treatment of red water has been truly empirical, and it now looks as though we are about to adopt rational measures. One important fact, however, must be borne in mind, and the client must be prepared for it, namely, the temporary pigmentation of the tissues.

We trust that practitioners will take up this line of treatment during the coming season, and that they will carefully note the results obtained and record them, so that others less favourably placed for satisfactorily testing its efficacy may reap the benefit of their experience. Should this method prove a success, the veterinary profession and agriculturists in general will owe a debt of gratitude to Professor Nuttall and his co-worker.

"VIS UNITA FORTIOR."

ONE of the most stirring topics agitating the veterinary profession in the United Kingdom at the present time is the suggested union of veterinary societies. The motto of the Royal College of Veterinary Surgeons—"Vis Unita Fortior"—provides the all-important reason for the accomplishment of some such union or amalgamation. With an united veterinary profession much that is desirable could be accomplished that is now impossible. One draft scheme has been put forward and discussed by several societies. Like all draft schemes, it does not pretend to be perfect. It can be improved in many ways, no doubt, but it forms an excellent working basis on which to proceed. Before various societies can agree to amalgamate they must see what advantages are likely to result from the union. The objects set out in the proposed scheme give a fair idea of what might be accomplished, given proper facilities, such as the support of claims of the profession to legitimate veterinary appointments, the defence of members involved in unfair prosecutions arising from practice, the arrangement for bacteriological examinations and analyses on favourable terms, and the establishment and administration of a benevolent fund, to mention just a few.

A National Society—national in fact as well as in name, and really representing the profession—would have an undoubted beneficial influence. All the objects of the proposed society are well worthy of support. To have two benevolent funds is a mistake, and a really strong defence fund would be more powerful in taking up cases. One efficient organization could deal better and more effectively with these matters. If the profession really desires to combine in an effective force which would have influence on public opinion and on Government bodies, amalgamation is the only way to do it. The parent body then might have geographical divisions, as England and Wales (North), England and Wales (South), Ireland, and Scotland. One advantage of this would be found in dealing with public bodies, such as, for instance, the Local Government Board for Ireland, for a branch representing the whole of Ireland, and backed up by the whole profession in the United Kingdom, would have much more influence than any individual society.

But all these advantages cannot be obtained without funds, and it is obvious that the present funds of local societies would not permit of large subscriptions from them to the proposed parent body. The only way out of the difficulty, and a very simple way, would be to increase the amount of the annual subscription by the amount required to finance the parent body. No individual should mind that, for his extra subscription would entitle him to advantages and privileges far outreaching what he could get in any other way. We think well of the principle, and hope a workable scheme will be evolved from the one now being discussed.

1910.

THE VETERINARY JOURNAL takes this opportunity of wishing all its readers throughout the world success and prosperity during the coming year.

EDITORIAL CHANGE.

WE are pleased to announce that Professor Gilruth, Principal of the Veterinary College of the University of Melbourne, has consented to join the Editorial Staff of the VETERINARY JOURNAL. We welcome him very heartily, and we are sure that he will prove a great acquisition. His enthusiasm and practical experience will substantially assist in maintaining, and possibly improving, the high standard of efficiency for which we have laboured in the past. We may also direct the attention of our Colonial readers to the fact that this journal may be obtained throughout Australasia through the agency of Messrs. Gordon and Gotch.

Indexed B. A. I.

General Articles.

THE PREVENTION OF STRANGLES.[1]

By General SMITH, D.S.O.

Director-General of the Army Veterinary Service.

The inefficiency and financial loss resulting from strangles cannot be too frequently impressed, and it is often a matter of surprise to hear this disease so lightly spoken of. As a matter of fact, there is no affection of army horses which can compare with it either in the prolonged inefficiency it produces, or in such far-reaching disastrous results. Not only is strangles responsible for a large amount of sickness among young horses, but with these it is the chief cause of pneumonia, pleurisy, and subsequently of "roaring."

Strangles is a highly infectious disease due to a micro-organism. It usually shows itself by means of abscesses in the region of the throat, but these are only the local manifestations of a disorder which exists throughout the system, accompanied by fever and wasting. Many horses suffer from it unrecognized, owing to the fact that no abscess forms externally; but many of the cases of so-called influenza, epizootic fever, or catarrhal fever, are nothing less than strangles without the external manifestation of an abscess. The nasal discharge of such cases frequently contains an organism which cannot be distinguished from that of strangles.

For some time past this Department has been endeavouring to protect horses against strangles by means of a vaccine or by inoculation to so weaken the attack as to modify the course of the disease. The results which have been obtained in the matter of "protection" are far from complete, but the great importance of the subject warrants the information which has been obtained being placed on record.

It is well known that the class of organism to which strangles belongs may, by suitable methods, be made to furnish a serum, which, when inoculated into a susceptible animal, confers a temporary protection against the disease. Working on these lines, various protective strangles sera have been produced, of which three have been submitted to experimental test during the past year. These are known in this report as A, B, and C.

The immunity conferred by a serum is only temporary, but it can be made to last one or two months; the time thus gained is invalu-

[1] From the Annual Report for 1908.

able, for strangles is only maintained in the army by the regular introduction of the disease by means of remounts, which in turn contract it in dealers' stables. If our remounts can be protected immediately they are bought, strangles should be capable of control. The first effort in the direction of protection was to ascertain whether any of the three mentioned sera would afford temporary immunity. The only method by which this could be determined was to take a batch of remounts, inoculate half with serum, and use the other half as controls. This was done in the following case:—

SERUM A.

Remounts inoculated	32
Subsequently affected with strangles twelve days later	1
" " " four months later	1
Remained healthy	30

CONTROLS.

Total number of remounts not inoculated	48
Subsequently contracted strangles	9

In the above observations it seems clear the serum was of use. The whole of the remounts formed one batch, and the chances of infection were equal. The horse which contracted the disease twelve days later was probably affected at the time of inoculation. The one which developed it four months after inoculation demonstrates that the immunity does not last that length of time; but one or two months' immunity are worth paying for, as in this way the disease could be practically excluded from the Service.

Serum B tested as above proved useless.

SERUM C.

Remounts inoculated	39
Subsequently contracted strangles	2
Remained healthy	37

CONTROLS.

Total number of remounts not inoculated	44
Subsequently contracted strangles	6
Escaped infection	38

Of the thirty-eight which escaped infection, a very large number subsequently suffered from catarrh; in fact, out of the whole batch of forty-four, only seven remained free from trouble of any kind, whereas in the inoculated batch of thirty-nine, twenty horses remained free from any form of catarrh.

The most severe test to which an animal protected with serum can be subjected is to expose it to infection; if protected, no ill-effect

arises, or if the protection is only partial the disease runs a mild course, and permanent immunity results.

Nine horses previously protected with Serum C were exposed to strangles infection under conditions which would have led to infection had they been susceptible. Of the nine, three had a rise of temperature on fifth, ninth, and thirteenth day after exposure, followed by catarrh and thickening of the glands of the throat, but at no time did any external abscess occur. Six of the nine were completely unaffected.

It may fairly be assumed that the previous protection with serum was the explanation of these encouraging results, but beyond that assumption we are not entitled at present to go until many more observations have been made. The only definite statement that can be made is that the results are encouraging and hopeful for the future.

The influence of serum in the treatment of cases of the disease is not encouraging. Serum A appeared to modify the course of the disease and the character of the discharge from the abscess, but both Sera B and C were without any action in this respect.[1]

Serum B was extensively used in catarrhal fever and pneumonia. The results obtained were very conflicting; occasionally its beneficial effect was marked, but frequently no result was observable.

These remarks on strangles were prefaced by a statement that the disease, in spite of its ravages, is not taken seriously. The spread of strangles through a batch of remounts is indicative of want of appreciation of its extreme infectiousness. The infectiousness cannot be assigned an exact expression, but it is so high that perhaps no horse can escape it that has not passed through an attack of the disease. This indicates the great care which should be taken in the isolation of remounts, and the further isolation of those showing signs of catarrh. It may be argued that insufficient stable accommodation exists to admit of anything but a very limited isolation. This is so, but there is always the barrack square available for seasoned horses, the remounts being accommodated in their stables.

The daily disinfection of mangers, walls, fittings, and flooring of stalls occupied by remounts during the strangles period is a tedious process, necessitating a small permanent staff for the purpose, but repays the trouble a hundredfold by the security it affords.

[1] Since this was written, it has been proved that animals treated with a special serum while the disease was in the process of incubation were not benefited, nor the violence of the attack in any way modified. Some improved method of employing serum with the sick is being looked for, but experience will, no doubt, show that the important point is to inoculate before the horses are exposed to infection.

The virus is readily destroyed by efficient disinfection with the spraying machines now available, which give great penetration and search out all cracks, crannies, and crevices, where microbes can lodge, while all brickwork, ironwork, mangers, bails, &c., are immediately sterilized by the disinfecting lamp. Nothing, in short, is required to keep an outbreak of strangles within moderate proportions but vigilance, thoroughness, and common-sense.

OCHRONOSIS OR MELANOSIS OF THE SKELETON OF THE PIG.

Indexed B. A. I.

By Professor A. E. METTAM, B.Sc., M.R.C.V.S., &c.
Principal of the Royal Veterinary College of Ireland, Dublin.

It is a well-known fact, known since the days of John Hunter's experiments with madder, that the bones may become pigmented, that in young bones colouring madders may be deposited in the matrix of the bones. Advantage was taken of this peculiarity to observe how bones grew, and when the madder was withheld from the diet a ring of new bone developed, free from colouring matter. In this way, in a long bone for instance, concentric rings of coloured and non-coloured bone formed corresponding to the periods when madder was given and when withheld.

I understand that it is not rare to find pigs in the large curing houses in Ireland which have pigmented bones, but I never came across a case until the present one, for which I am indebted to Mr. J. A. Jordan, M.R.C.V.S., Veterinary Inspector, Belfast. The specimen included portions of the chest-wall, sternum, four dorsal vertebræ, and the portion of the right innominate bone, femur, patella, tibia and fibula of the same limb. I am informed that all the bones of the skeleton showed the same condition. The animal was apparently in good condition, and had been purchased for curing purposes. It was of the white breed, but any further information I am unable to obtain. The bones were dark mahogany brown to black in colour, but otherwise normal. The cartilages were *not* coloured. The red marrow of the ribs and sternum when squeezed out of the bones was as if mixed with ink or blacking, the "yellow" marrow of the shaft of the long bones was greyish in colour. A single lymphatic gland found in the position of the prepectoral lymphatic glands was dark brown or blackish. The colour extended into the cortex of the gland, but to the naked eye the medulla was free. No pigmentation was observed elsewhere, and the intima of such portions of the vessels as

were left was also free from pigmentation. No pigmentation of intermuscular fascia or other parts was found.

In man there is a condition known as ochronosis, first observed in 1866 by Virchow accidentally at the *post-mortem* examination of an old man. It is manifested by pigmentation of the cartilages, which are of a brownish or blackish hue. Cohnheim, in his lectures, referred to the case, and mentioned that, in addition to the cartilages and intervertebral discs being pigmented, there was also discoloration of the intima of arteries and of the synovial membranes. The colour appears to have been due to an evenly diffused saturation of the matrix of the tissue with pigment. According to Thoma, Virchow and Böstrom have described two cases of pigmentation of all the cartilages of the body, which was caused by a granular black-brown pigment, which was partly in solution and partly present in granules. Diseased portions of the endocardium, and of the arteries, where there was thickening by connective tissue showed the same colour. The pigmentation is said to have been due to absorption of disintegrated blood pigment, but no explanation is offered as to why other tissues escaped. Nor is there any description of the condition of the organs, as for instance the kidneys.

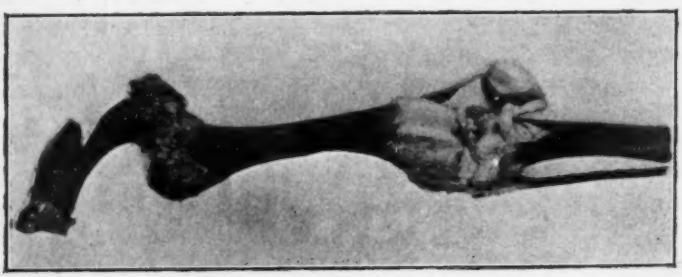
In 1904 Professor Osler recorded two cases of ochronosis occurring in brothers. The cartilages of the ears were involved, and the sclerotics were stained of a brownish-black colour. In one there was a butterfly-like patch of ebony-black pigmentation of the skin of the nose and cheeks. A chronic arthritis was a complication. These two cases with that of Virchow are included in the nine cases recorded in medical literature.

The cause of the condition is unknown. Virchow believed it was due to permeation of the cartilages by the derivatives of hæmatin, but that is probably incorrect, as Hanseman noticed that melanuria was present along with the lesion. Hecker and Wolf concluded after studying the urine that the colour was due to melanin. Albrecht found in the urine homogentisic acid, and suggested a connection between ochronosis and alkaptonuria. (Alkaptonuria is characterized by the tendency of the urine to darken on exposure to the air due to the presence in it of two acids—homogentisic and uroleucic acids. It is of rare occurrence, persists throughout life, and has apparently little effect upon the general health.)

Pick considers that ochronosis is a definite form of melanotic pigmentation, and that it is due to the same cause as melanosis or melanin formation generally—to the action of an enzyme, tyrosinase

upon a constituent of the protein molecule. Generally the pigment formed is converted into a colourless product which is excreted, but when for some reason this does not occur it produces pigmentation of the parts where it is retained.

In the specimen under discussion I examined the red marrow, films and sections, also sections of the heads of the ribs and transverse sections of the ribs. The red marrow films, stained by Leishman and Jenner's stains, and also by hæmatoxylin and eosin, showed the usual constituents of the red marrow, but in addition larger cells filled with pigmented granules—chromatophores. The cells were nucleated, contained one or more nuclei, the nucleus or nuclei being of the vesicular kind, but generally shrunken and collapsed. It was somewhat of the same kind as the nucleus of a hyaline cell. In the



Skeleton of hind limb of pig, showing the dark pigmentation of bones, except where covered with cartilage.

protoplasm of the cell were numerous granules of different sizes, coccus-like, of a brownish colour, the colour varying in intensity. The pigment-bearing cells were numerous in the films, in the sections of red marrow, and in the sections of bone including also red marrow. In addition to the cells containing pigment numerous free particles of pigment were present, some of which doubtless had been liberated from ruptured chromatophores. The chromatophores measured from 21·6 to 44 μ in diameter.

In the sections of heads of the ribs calcification was proceeding normally, and there was nothing abnormal in the articular cartilages nor any indication of deposition of pigment. The spaces in the cancellated bone contained red marrow, which showed numerous chromatophores. These chromatophores were distributed evenly throughout the marrow, and some placed close to the plates of cancellated bone. They have nothing to do with nor any connection with the myeloplaxes.

In sections of the bone I was surprised to find little or no evidence of deposition of pigment. True, under the periosteum there were fine granules in the matrix, and here and there through the section minute pigment particles, but nothing to account for the intense colouration of the bone in mass. In the contents of the Haversian canals chromatophores were present; in one canal, for instance, three could be made out filled with minute particles of pigment. Similarly also the canaliculi of some of the bone lacunæ, containing bone corpuscles, were rendered clear and unmistakable by pigment, which acted as an injection mass in the minute tubules, and here and there a bone corpuscle showed pigment. Nevertheless, microscopic evidence of the presence of pigment was difficult to find, and what I have described above was found because it was diligently sought for. I am compelled to conclude that the pigment was in solution, and that the colour of the bones was due to a soaking with pigment-containing fluid. The bones when placed in formalin and other preservative solutions gave up a considerable quantity of pigment, showing that the pigment is not so firmly fixed as in melanotic fibromata, for instance, and the absence or practical absence of granules in microscopic sections of the bones shows that the bones are stained with the pigment much in the same way as a section of bone or cartilage is stained by eosin or other protoplasmic stain.

Examination of the lymphatic gland showed that in the cortex were a number of cells containing granules of pigment. These granules were apparently entering into solution, because cells filled with granules, others with few, and others again free from granules, all of the same kind, were readily found. The cells are evidently the so-called hyaline cells with abundance of protoplasm around the nucleus. The pigment had stained the reticular network of the gland, and it appears as if impregnated with a fine granular pigment or a precipitate. It is not a precipitate, however, since the colour or the granules is present nowhere save in the delicate recticulum. The only explanation of the appearances observed is that the large chromatophores reach the lymphatic gland, and there the pigment is discharged or enters into solution and dyes the reticular connective tissue with which it comes in contact. The pigmentation is particularly well seen in the lymph channels of the cortex and medulla, and does not appear so markedly in the germinal centres of the gland. It is probable that the colour is in solution in the lymph, and as such is carried into the blood to be excreted. In the gland there are numerous eosinophilous cells, many more than under ordinary conditions, and their presence in great

numbers is itself suggestive, as they are probably evidence of positive chemiotaxis.

The absence of pigmentation elsewhere in the body may indicate that in the red marrow the pigment is converted into a colourless substance, and as such excreted. This is mere speculation, but there is some support for this belief in the character of the chromatophores and the contained pigment; it is not so deeply coloured, it is not so "fast" or fixed as in other melanotic lesions, and a larger amount than usual is soluble in water.

So far as I am aware, the condition has not been noted in veterinary literature, and I regret that more tissues and organs were not available for examination. It would have been of great interest to have examined the blood and the urine to note any changes and to see if this case could be brought into line with those observed in human medicine. Lastly, is it correct to describe it as ochronosis in view of the distribution of the pigmentation in man, or should we be content to call it melanosis? Because of the close relationship between cartilage and bone, and from usage, I incline to the first term, though, when all is said and done, it matters little which term we use, as the first signifies the colour is yellow, the latter dark brown or black, and the cause of both is probably the same.

NOTES CONCERNING *TRYPANOSOMA DIMORPHON.*

With a Few Preliminary Observations on the Trypanosomiases of Southern Rhodesia.

By L. E. W. BEVAN, M.R.C.V.S.

Government Veterinary Bacteriologist, Southern Rhodesia.

In 1902, when engaged in the Trypanosomiasis Expedition of the Liverpool School of Tropical Medicine, two distinguished investigators, J. Everett Dutton and John L. Todd, encountered in the blood of horses a pathogenic trypanosome which they described under the style of "the Gambian Horse Trypanosome." These observers distinguished three forms of the parasite, namely: (1) A slender long form; (2) a short "tadpole" form; (3) a "stumpy" form. Subsequent investigators, however, in studying the parasite have distinguished only the two latter forms, and the parasite has thus become known under the name of *T. dimorphon.*

Recently, in working with the strain of the parasite brought back from Africa by Dutton and Todd, various observers—viz., Thomas,

Breinl, Laveran, and Mesnil—have failed to see the long forms with thin body and free flagellum originally described, and it is suggested that Dutton and Todd were dealing with a mixed infection, one of which has died out. Bruce therefore suggests that, in the event of the name *T. dimorphon* being dropped as a misnomer, the compliment should be paid to Dr. Todd by naming the parasite after him.

Within recent years quite a considerable number of observers have met with the *T. dimorphon*, not only in equines, but in other domestic animals. Indeed, Dutton and Todd themselves, with Kinghorn, in their report of 1907 on the cattle trypanosomiases of the Congo Free State, mentioned that trypanosomes which they believed to be *dimorphon* were found in cattle of nearly every herd examined.

In 1904 Major F. Smith discovered a trypanosome (about 13 μ long) in a blood film taken from an ox which died in Sierra Leone. Nabarro thinks this may have been the small form of *T. dimorphon*.

Martin, in 1905, studied the trypanosomiases of the Lower Guinea, the mountainous districts of Fonta Djalon, and of Lubé, and along the banks of the Niger. He found that the horse, ass, ox, sheep, goat, pig, and dog were liable to infection. "Nearly all the trypanosomes had common characters, and appeared to belong to the type *dimorphon*."

Martin hazards the suggestion that a wide belt of the African Continent, parallel with the Equator and extending from Gambia and Guinea on the West to the Anglo-Egyptian Sudan and Uganda on the East, is infected with *T. dimorphon*.

On March 25, 1909, at a meeting of the Rhodesian Scientific Association, a paper compiled by Montgomery, of the Liverpool School of Tropical Medicine, was read, and contained the announcement that he and Kinghorn had found the *T. dimorphon* widely spread in Northern Rhodesia between Broken Hill and Tanganyika, and had obtained specimens from the Katanga district of the Congo.

As is well known, *T. gambiense* of man is travelling in a southerly direction into Rhodesia, which was previously uninfected. The question that arises is, is *T. dimorphon* following a similar course? We have this evidence, that previous to 1907 *T. dimorphon* had not been seen in Rhodesia, that prior to 1908 no trypanosomiasis of any nature had occurred in the regions of Portuguese East Africa which are now infected with *dimorphon*, and that the area of Zululand in which Bruce carried on his classical work and met *T. brucei* alone is now naturally invaded with *T. dimorphon*.

One could not be criticized severely for interpreting this as a southerly extension of the organism first found in the Gambia. Shortly after Montgomery's declaration certain blood smears taken from cattle in the Hartley district of Southern Rhodesia were sent to Theiler, who found in them *T. dimorphon.*

* * * * * .

Recently Bevan succeeded in infecting a rabbit with trypanosomiasis by inoculation with 2 c.c. of blood from an ox suffering from the trypanosomiasis at present existing in the Hartley district. This

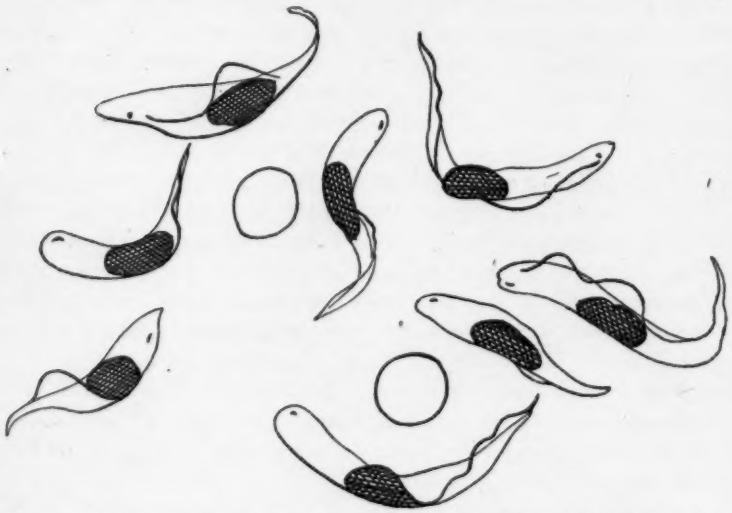


FIG. 1.—Trypanosomes seen in Blood Smears of Calf sixteen days after inoculation with "Hartley" Blood.

animal died unexpectedly in his absence on the seventeenth day after inoculation, but some blood smears were taken before putrefaction had become too far advanced. Specimens were sent to various authorities. McFadyean failed to stain any of the preparations well with Giemsa, and could not get the membrane or flagellum well shown. He therefore found it difficult to offer an opinion as to the species of trypanosome present, but wrote, "As far as I can judge, they do not correspond with the *T. dimorphon.*"

Mesnil also hesitated to express an opinion on coloured preparations, but to him the trypanosome appeared to be *T. dimorphon* (*sensu stricto*). Specimens from the same rabbit, together with other smears from "fly-struck" cattle at Sipolilos, were sent to the Director of the

Sleeping Sickness Bureau of the Royal Society, who found in one of the Sipolilos slides that trypanosomes were numerous and certainly suggestive of *T. dimorphon.* In all that he could clearly see there was no free flagellum.

It may be found that the parasite is neither *brucei* nor *dimorphon (sensu stricto)*, but a distinct species.

With regard to the trypanosome recently found in cattle in Southern Rhodesia it has to be admitted that circumstances have prevented any careful or minute laboratory observations. Work in

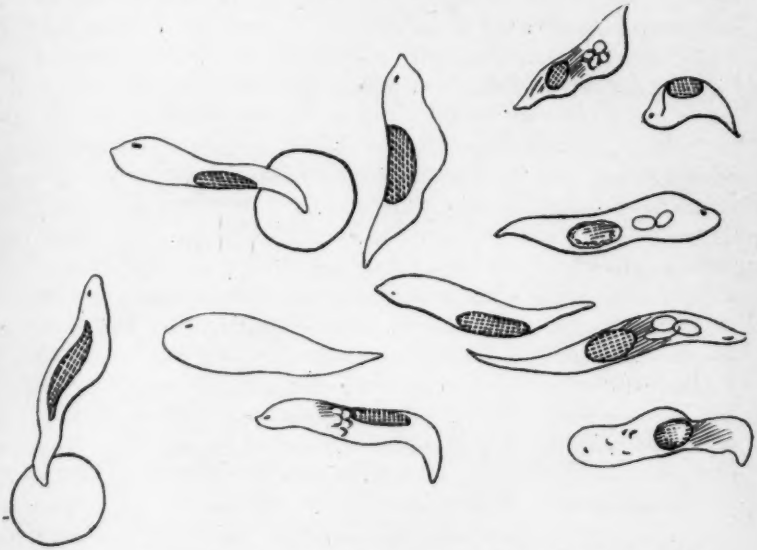


FIG. 2.—Degeneration forms of Hartley trypanosome from blood of dead rabbit.

the field involving long journeys in the endeavour to determine the number and extent of infected herds and districts, the collection of evidence bearing on the problem of the transmission of the disease, the fact that the majority of infected animals had died before the writer's return in May, leaving only a few chronic cases in which parasites were few or difficult to find, and that inoculated laboratory animals have shown a marked resistance to inoculation, have all combined to render laboratory investigations irregular and incomplete. For these reasons the following observations may subsequently be found to require alterations and amendment. In cases of natural infection (cattle) the parasites have been very scarce, even when the

blood or gland smears have been made from dead animals or those known by their clinical manifestations to be severely affected. In several such cases a cover-glass preparation has contained only one or two specimens.

This accords with the experience of Dutton, Todd, and Kinghorn, who, in connection with the cattle trypanosomiasis in the Congo Free State, found that in some cases "every means may frequently fail to show the parasite in infected animals." Montgomery and Kinghorn also record similar experiences.

Morphology.—In blood smears from sick cattle in the Lomagundi and Hartley districts the trypanosomes met with have corresponded to the "long" and "intermediate" forms pictured in the illustration in Laveran and Mesnil's work, "Trypanosomes and Trypanosomiasis," p. 242.

True "tadpole" forms and "long" forms with definite free flagellum, as figured in Dutton and Todd's report, have not yet been encountered in naturally infected animals.

Leishman's stain does not colour the protoplasm very deeply; Giemsa's gives it a puce colouration; the latter brings out an undulating membrane very little festooned. It is best seen when the preparation is rather over-coloured. A free flagellum (*sensu stricto*) has not been seen, but the protoplasm anterior to the nucleus tapers off gradually to the extremity of the membrane. Chromatic granules and vacuoles have not been seen in natural cases. The centrosome is situated laterally a little distance from the posterior extremity, which is blunt or conical; "pike" forms have not been noted. The posterior extremity takes the colouring very faintly. The nucleus is irregular; Laveran's stain brings it out most clearly, and gives it an oval shape. The red staining matter appears fragmented. By other methods of staining it appears irregular and elongated, occupying the whole width of the parasite. Fission forms have not yet been observed, but one parasite with two flagella has been noted.

The measurements made vary from 15 to 30 μ in length, and from 1·5 to 3 μ in width; forms about 30 μ long predominate. The trypanosome not a little resembles the illustration of *T. nanum*, figured in the Third Report of the Wellcome Laboratories, p. 137, but without the free flagellum. In a blood smear from one badly infected animal at Sipolilos which had recently come from North-eastern Rhodesia, a single giant trypanosome, recalling *T. theileri*, was seen. Although many thousands of blood smears from sick cattle in all parts of Southern Rhodesia have been examined by the writer during the past

few years, this is the first occasion on which he has met with a trypanosome of this type.

With regard to the Southern Rhodesian trypanosome herein referred to, it is suspected that investigations may prove that it is not identical with *T. dimorphon*, and research will have to be carried on in the lines suggested by Bagshawe.

There can be little doubt that field observations are of as great importance as laboratory investigation, since, in the latter, results are often vitiated by different methods of technique. The virus is modified by time and passage through animals which are not the natural hosts of the organism; the experimental animals are kept in unnatural surroundings which tend to influence the course of the disease.

The most accurate results could only be hoped for by a combination of field and laboratory experiments on the spot.

Animals Susceptible.—In this connection some interesting observations have been made in connection with the Hartley trypanosomiasis. While the transport oxen engaged between Gatooma and the "Golden Valley" have contracted the disease and died in great numbers, donkeys working at the same time and at the same mines, being subjected to practically identical conditions, have escaped. In the same district a transport agent has been using some twenty mules continuously for the past eighteen months, and has frequently exposed them in the most dangerous localities. The argument that these animals travelling at a greater pace than oxen are submitted to less danger will not hold good, since they have been out-spanned and allowed to graze in well-known fly areas. Nevertheless, not a single death or case of sickness has occurred, and, in spite of hard work, they are all in good condition.

Similarly not a single mortality from "fly" has occurred among the police horses and mules which have patrolled the district regardless of danger.

A mine-owner in shifting his "plant" from one property to another worked oxen and mules alike along the same road through a "fly-belt." The oxen died, but the mules are alive and apparently in good health.

At one mine cattle and donkeys were working; the former are all dead, the latter all alive at the time of writing. At this mine two English-bred dogs have been exposed without harm throughout the whole "fly" season. Every time the cattle came to this mine "tsetse" came with them, and were afterwards caught in the windows of the house, a fact which may be of interest to entomologists. The dogs

which were generally in or near the house must have been frequently exposed to infection.

Symptoms.—The cases of trypanosomiasis of cattle in the Hartley district of Southern Rhodesia seen since May have been examples of the chronic form of the disease, the animals acutely affected dying earlier. The majority of deaths occurred between January and May, an explanation for which may perhaps be found in the circumstance that blood-sucking flies of all descriptions, and among them the *Glossina morsitans*, were most numerous and active during the hot, sultry weather of November, December, and January.

These early acute cases were not very carefully observed, but cattle inspectors and others have told the writer that they frequently met with temperatures as high as 106° F. and mortality among cattle in good condition. On the other hand, the chronic and lingering cases seldom show an elevated temperature, and not infrequently a sub-normal one is met with even in the extreme heat of the day.

These sick cattle, which have survived the wet season and have reached the cold, dry months of July and August, are not only reduced to a skeleton by the disease, but are also handicapped by the poverty of pasture. It is sometimes extremely difficult to determine whether specific disease or hard work and lack of food is responsible for the poor condition of the animal.

"Fly-struck" animals, as a rule, have a hard, dry coat, the hair standing on end and appearing very coarse and dusty. In places the hair falls off, leaving a bare patch, from which the skin peels off in flakes. The animal is "hide-bound," "tucked-up," and shows no inclination to lick itself. Tears run from the eyes and strings of mucus from the nose, and saliva dribbles from the mouth. The prescapular glands may or may not be enlarged. In some undoubted cases of the disease the glands were not more prominent than normal.

The animal is seen at its worst in the morning, when it often refuses to rise, and is loath to leave the kraal. In nearly all far-advanced cases there has been great weakness of the hind-quarters, the animal swaying and dragging its legs; it is often too weak to lift its feet to avoid a stone.

The muscles of the hind limbs and quarters waste away, the anus is retracted, and the sphincter seems to lose its power, so that fæces accumulate in the hollow beneath the tail. Chronic diarrhœa is frequently met with, together with the loss of power to regulate the discharge of fæces; the animal's hind-quarters thus become foul and scalded.

The animal feeds greedily; even in those cases where it is too weak to stand up it will lie feeding the whole time, even up to a few hours before death. The mucous membranes are anæmic, and the pulse is weak and fluttering.

The foregoing notes are based upon a preliminary observation of the disease, and time and experience may bring to light many inaccuracies.

EPHEMERAL FEVER OR THREE DAYS' SICKNESS IN CATTLE.[1]

By G. W. FREER, M.R.C.V.S.
Cape Town, South Africa.

Indexed B. A. I.

The disease "ephemeral fever," or "three days' sickness," is one of the many plagues with which South Africa seems to be peculiarly cursed, but unlike many of the others, it has, fortunately for us all, caused no great mortality up to the present. The scientific term "ephemeral fever," as well as the lay term "three days' sickness," are both somewhat appropriate, as in the great majority of cases the disease quickly runs its course, and all acute symptoms have disappeared at the end of three days. The earliest report of this disease is that of Mr. Bevan, one of the Rhodesian Government Veterinary Surgeons. In an article contributed to the *Journal of Comparative Pathology*, he states that the disease first made its appearance amongst cattle in North-western Rhodesia, and was investigated by Government Veterinary Surgeon Edmonds during the latter part of November, 1906. On January 7, 1907, the disease appeared a few miles south of Buluwayo, and from there it gradually spread until it reached the Transvaal and Natal, where outbreaks were officially notified during the last week in March. Mr. Bevan in his report makes mention that several of the old Matabele natives state that the disease has been in their country before, and a reliable native driver, who accompanied the pioneers to Rhodesia, stated that it existed in Khama's country about twenty-five years ago.

Some few weeks ago I obtained from the Uitenhage Library a book of travel called "The Heart of Africa," written by Dr. George Schweinfurth about the year 1867, in which he describes a disease among the native cattle of Central Africa, the symptoms being identical with those of the "three days' sickness." I am of the opinion that this is no new disease to the African Continent, but has been in existence for generations, and it is only on account of the

[1] Contributed to the *Agricultural Journal of the Cape of Good Hope.*

country being now opened up to traffic that it has commenced to spread in new areas. With regard to outbreaks in this colony, cases were reported in the Vryburg district by Government Veterinary Surgeon Simson during February, 1907, and a little later in the Transkei by Veterinary Surgeon Hutchence. The disease then slowly travelled down until at the end of 1907 outbreaks occurred in the Uitenhage and adjoining districts, where with intervals of quiescence it has remained ever since.

Cause and Mode of Infection.—Ephemeral fever is due to the entrance into the system of a specific organism, and can be transmitted to a healthy animal by inoculation with blood from a sick animal. Cattle of all breeds, and in all conditions, whether fed on sweet veld or sour, karoo or coast veld, are susceptible to this disease. I have noted that young calves seem to possess a greater resistance to natural infection, and fat and stall-fed cattle usually show more acute symptoms than those in low condition. Mr. Robertson, the veterinary bacteriologist, during the course of a series of experiments, found that cattle showed signs of sickness from two to three days after inoculation with virulent blood. We might reasonably conclude, therefore, that the period of incubation is from two to three days. He also found that one attack conferred an immunity for six weeks and that the blood of a recovered animal did not produce the disease if bled when all the symptoms had subsided.

The tranmission of the disease in nature is probably through the agency of night midges, in the same manner as malarial fever of sheep. This would account for the fact that cows, kept for long periods in yards in town entirely isolated from others, have contracted the disease. So far transmission experiments conducted with ticks have failed.

Symptoms.—These in the majority of cases are so very marked that there is no great difficulty of diagnosis. The general appearance of a bovine suffering from an attack of "three days' sickness" is very much like that of the wooden cow we obtained from the toy shop in our early youth. There is the same characteristic look of extreme helplessness, with the evident disinclination to move unless assisted. The principal symptom is stiffness of one or all of the extremities, and usually of the whole body. One peculiarity is that the stiffness may rapidly pass from one limb to the other. The earliest indications of an attack are loss of appetite and suspension of rumination, a rise of temperature with roughness of the coat, and a watery discharge from the eyes and nose. In a few hours these symptoms rapidly develop

when the temperature may reach 106° F. Painful lameness appears in one or more limbs, or general stiffness of the whole body. The stiffness of the neck with more or less inability to swallow is very characteristic. The mucous membrane of the mouth becomes reddened, the eyelids swollen, and the eye glaring in appearance. The bowels may be relaxed, but in the majority of cases are constipated, the fæces being covered with strings of mucous. In cases where the sick animal lies down there is inability to rise, and when placed on its feet there is evidence of loss of power, and it quickly resumes the recumbent position. In about forty-eight hours the temperature falls nearly to normal, appetite returns, acute symptoms disappear, and in the greater percentage of cases the animal is convalescent at the end of three days. I have frequently seen cases where the symptoms have been so severe that one has felt doubtful as to whether the attack may not prove fatal, and find the patient on the following morning with no trace of disease, and feeding well.

In some instances complications may arise and the symptoms persist for two or three weeks. These cases are fortunately rare.

Post-mortem Appearances.—As the majority of deaths usually put down to "three days' sickness" are found on investigation to be due to other causes, one rarely finds a fatal case where the *post-mortem* symptoms are typical. The following are the most important: Enlargement of almost all the lymphatic glands of the body, particularly those in front of the sternum or breast-bone. They show areas of hæmorrhage, and are more juicy than normal. Slight reddening of the mucous membrane lining the fourth stomach and intestines, no other lesions are constant. These symptoms are taken from cattle suffering from a typical attack, and destroyed by Mr. Robinson, the veterinary bacteriologist, for the purpose of investigation.

Mortality.—The mortality from the disease itself has been almost *nil*. Numerous deaths have been reported, but in those cases where I have been able to make a *post-mortem* examination I have invariably found that the loss has been due to some complication. In those cases where the animals are suffering from stiffness of the neck, and owners persist in pouring down all kinds of noxious fluids, there is every probability that death will ensue from pneumonia. The unfortunate animal being unable to swallow properly, the fluids naturally gravitate down the trachea into the lungs. Deaths from redwater and other like diseases have been frequently mistaken for ephemeral fever. It can be reasonably understood that where there are several cases in the one herd the owner might think that each fresh case was

due to the same cause, and in the majority of instances consider it unnecessary to inspect the animal. Since the introduction of ephemeral fever, there has been a considerable increase in the number of cases of redwater, even on farms where cattle have been considered salted for some time. I am of the opinion that this is due to the attack of ephemeral fever so lowering the tone of the animal's system as to lose its resistance and so enable the redwater parasites to gain the upper hand.

Immunity.—Veterinary Surgeon Bevan, in his report to the *Journal of Comparative Pathology* of June, 1907, stated that there is no record of an animal having suffered from a second attack of the disease. Although it has been my experience to find that in a large percentage of cases one attack does confer an immunity for a considerable time, still I know of numerous cases where cattle have had two and three attacks, and only a month ago I saw two cows, the owner of which assured me that they were suffering for the fourth time. In the majority of cases the second attack is worse than the first.

Treatment.—In this disease, the less the patient is interfered with the better will be the results. In the event of the bowels being very constipated, a dose of Epsom salts would be beneficial, but I would advise great care being exercised in administering it, especially when the neck muscles are affected. I strongly recommend keeping the animal in a cool, shady place (if possible), attend to its general comfort, and leave the rest to Nature. From time to time numerous so-called remedies have been advocated as certain cures for this disease, but I am convinced that they are all equally worthless. Transport oxen should not be inspanned for at least a fortnight after recovery, as they are quite unfit for work before that time. Many farmers have found that out from very bitter experience. As the disease can be communicated by direct inoculation, Mr. Robertson, the veterinary bacteriologist, recommends this course to transport-riders who wish to get their spans through the disease, and have done with it. It is certainly better to have all the cattle affected at one time than to be worried with isolated cases for weeks, which probably keep the infection alive on the farm.

As far as preventive measures are concerned, none are known at present, but as the disease is carried by insect life, there is a possibility that some application can be found which will assist in keeping them off the animal, although the expense and trouble of applying it may be more than the pecuniary loss from the disease itself.

Clinical Articles.

A PRELIMINARY NOTE UPON THE NEW OPERATION FOR ROARING IN HORSES.

By FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.

Kensington, London, W.

The question of the cure of "roaring" in horses has occupied many minds, and it is scarcely necessary to discuss here the numerous operations and suggestions which have been attempted. Suffice to say that up to the present none have claimed to be absolutely a specific. The extraordinary success which has, however, followed a brief series of cases which have been operated upon by the method originally suggested by Dr. W. L. Williams, the Professor of Veterinary Surgery in the Cornell University Veterinary School, Ithaca, New York, made me anxious to put them on record with a view to encouraging others to perform the operation, and thus to obtain percentages and statistics; for the number of "roaring" hunters and racehorses in this country is "legion," and it is during the hunting season that one has the opportunity of discovering likely patients who would otherwise be sold, shot, or have tracheotomy performed before another hunting year. Williams' operation has the distinct and definite advantage that it does so very little damage to the cartilages of the larynx. Beyond splitting the cricoid cartilage in order to thoroughly expose the interior of the larynx the cartilage tissue is not damaged at all, and in a recent letter which I have had from Professor Williams (dated December 8, 1909) he states that in some cases even this can be avoided; he writes "The two last cases I have operated upon without difficulty through the crico-thyroidean ligament, without wounding a cartilage at all." The failure of the arytenoidectomy operation was largely due to the fact that the larynx suffered so much damage, and granulation tissue gave so much trouble afterwards. In Williams' operation the object is to strip off all the mucous membrane which lines the ventricle of the larynx, thus making two raw surfaces, which eventually adhere and "cause the arytenoid cartilage to become fixed against the side of the glottis by cicatricial adhesion."

The method of operating is as follows: The horse is cast, chloroformed deeply, and placed on its back with the throat well extended. The region of the throat and larynx is shaved and rendered antiseptic. The larynx is then located and cut down upon (a very good guide being

an imaginary line drawn across behind the angles of the jaw), care being taken to incise between the muscles and to separate them carefully in order to avoid hæmorrhage as much as possible, and the cricothyroid ligament is then exposed. This is incised with a scalpel, and the cricoid cartilage, which is very hard, is split with a fine-toothed saw. As stated a few lines above, Professor Williams has managed on two occasions to operate without damaging this cartilage at all. Tracheotomy is not necessary, and was not performed in any of the undermentioned cases.

A specially shaped retractor is now introduced and the two cut edges of the larynx held well apart, so that the interior can readily be viewed. One notices the vibrating right vocal cord (if this one is healthy) with each act of respiration, whilst the left one lies quite still and is paralysed. With a long, specially made, tenaculum forceps, the mucous membrane lining the interior of the larynx is grasped and pulled tense, whilst an incision is made behind it with a long, double-edged, razor-bladed scalpel. This incision is continued until the whole of the mucous membrane lining the ventricle has been incised, or, if the operator prefers it, when once the incision has been started, the greater part of it can be separated with the handle of the scalpel, some blunt instrument, or even with the finger. The interior of the larynx is then swabbed with sterile wadding tampons, and the patient allowed to come out of anæsthesia.

After-treatment consists in dressing the wound antiseptically each day, two or three times at first, then finally once or at discretion, and in from three to four weeks there is only a small scar left to denote the site of operation. As soon as the wound has healed the horse may be taken to gentle exercise and gradually got into condition.

The following four cases illustrate the operation clinically, and are, I believe, the first to be done in England; although for the past four years the operation has been done in America. Numbers 1 and 2 were done at my request by Professor Williams, who very kindly explained each step and freely showed myself and a number of veterinary friends who were present every detail.

Case 1, September 10, 1909.—A bay half-bred hunter gelding, aged about 9, a big upstanding horse and a heavy-weight hunter. This animal was a great favourite of the owner, and had been a "whistler" for some time, but at the end of the last season had become a distinct "roarer," and could not gallop far or up an incline without exhibiting signs of great distress.

The operation passed off satisfactorily, the wound healed well, and

on October 7 the horse was lunged by Mr. Guy Sutton, F.R.C.V.S., in a small circle without showing the slightest distress, and without those around being able to detect any noise. On the 9th he was ridden twice at a gallop round a large field, making only a very slight noise, and then returned to the owner. After a couple of months of exercise he was taken into the hunting field, and the owner has been very delighted with the result, as the horse gallops well without any distress, and makes no abnormal respiratory sound at all.

Case 2.—Bay thorough-bred hunter gelding, aged 8, the property of a lady, a keen rider to hounds. This horse was operated upon on the same day as Case 1; the result was equally successful, and the horse was sent into Somersetshire on October 10. On the 11th I received a note acknowledging the safe arrival of the horse, the owner stating that they noticed "no noise such as he had used to make when walking up the hill from the station." On the 15th I received a note to say that he had been trotted up a steep hill without any sound being observed, whereas previously, even at a walking pace, he made a noise. On the 23rd further confirmatory evidence of this was sent in a letter; "he can now trot uphill without making a sound, which he would not do before his operation. We all think he is cured." He was taken out afterwards with the staghounds and gave every satisfaction, and on November 18 I personally tested the horse in a two-mile gallop, which the animal could not possibly have done before without showing great distress, and the result was in every way satisfactory, as no abnormal sound could be detected. Since then the improvement has been maintained. This horse had strangles as a yearling out at grass and had been a whistler ever since.

Case 3.—A bay hunter mare, aged 8, a frightful roarer. This animal could not gallop a quarter of a mile without evincing the greatest signs of distress. Operated upon on November 9, the wound gave no anxiety, and on December 3 the animal was tested. The improvement was marvellous, as no distress was evinced and no abnormal sound at all could be heard whilst the mare trotted and cantered freely and easily. On the 15th she was tested up and down a hill at a smart gallop without the slightest distress. This improvement has been maintained.

Case 4.—A brown hunter gelding, aged 7, a very bad roarer. This animal, like Case 3, could not gallop more than a few hundred yards without evincing the greatest distress, and was operated upon on November 13. In this animal a much larger portion of mucous membrane was removed than in previous cases, this including that

covering the ventricle of the larynx. The wound healed well, but recovery was somewhat retarded by a slight attack of liver congestion. The report upon this horse is that when galloped he "whistles" slightly, but as the animal is altogether out of condition it is possible even this may disappear. At any rate, even now he is greatly improved.

Remarks—The remarkable success which has attended each case makes it worth while to publish the facts, even although only in a preliminary form. The horses will be closely watched and critically examined, and I purpose to trace them up from time to time with a view to observing whether the improvement is, or is not, a permanent one.

CERVICAL TUBERCULOSIS AND FRACTURED FIRST RIB IN A MARE.

By C. PACK, M.R.C.V.S.

Lymington, Hants.

In June, 1908, I was requested to attend a cart mare, aged 6. I had known the mare for some two or three years, and had attended her late in the previous year at an abortion.

I found her scarcely able to move, the muscles of neck and fore-arm being very tender and stiff; temperature 104° F., pulse 70. When moved her gait suggested laminitis of the fore-feet. She was unable to lower her head. I could discover no trace of tetanus, and dismissed the idea of laminitis.

Having recently experienced two other cases with somewhat similar symptoms, both of which eventually recovered and are working at the present time, I diagnosed the case as acute rheumatism, and treated accordingly. Three months' treatment failed to effect any improvement, and the owner decided to await events and give Nature a chance.

During the treatment the hind limbs and back appeared to be sometimes affected, but the muscles of the neck and the cervical vertebræ retained their soreness all the time, although she managed eventually to feed off the ground.

Late in the year a case of tubercular ostitis, reported by a North-country practitioner, appeared to me to be on all fours with the present one, and I communicated my fears to the owner, and suggested the "tuberculin" test, to which he (the owner) demurred. So the case went on. On one occasion she got down in her box and had to be

assisted to rise, the aid of the slings being necessary. Her appetite remained good, and there was no great loss of flesh.

In July of this year, being at the farm, the owner mentioned that the mare had much improved, and turned her loose in the lane for me to see her improved action. She came down the lane at a trot, and when opposite her box made a big stumble, and hobbled in very lame. I suggested her feet being shortened as they had grown very long. This, I understand, was done with difficulty. About a month later I was asked to see her again, when I found her with a dropped elbow. I was informed that this condition appeared a day or so after I saw her last. I at once diagnosed fracture of first rib, and advised that she be destroyed.

This was carried out, and to confirm my diagnosis I made a casual *post mortem*. On discovering the fractured rib, I was struck with what appeared to be bony deposit there, and asked the slaughterman to remove both front ribs and some cervical vertebræ and boil them out for my future inspection. On examining the bones after boiling, the two last cervical and first dorsal vertebræ were seen to have been extensively affected with ostitis. They were much enlarged and porous, and were ankylosed. The upper part of the fractured rib was similarly affected with ostitis, and the other rib showed deposits indicating the commencement of the same condition there. I did not notice any tubercular deposits in the contents of thorax, but regret now that I did not make a more complete *post mortem*, as by the time I obtained the bones the carcase had been made away with. I have no doubt the fractured rib was caused at the time the mare stumbled.

TUMOUR OF ONE HORN CORE IN A HEIFER.

By C. PACK, M.R.C.V.S.

Lymington, Hants.

In May, 1908, my attention was called to a two-year-old heifer with one horn much more developed than the other. Despite its size the horn itself appeared quite normal, but very thick at the base, as though expanded by an enlarged horn core. It did not appear to be a case for treatment, and none was adopted.

I saw the heifer occasionally out of curiosity. Her health did not appear to suffer or be impaired in any way. She calved down and became a useful milker, but the extra length of one horn was a decided inconvenience to her in the stall. It continued to grow out of all proportion to the other one, and in July of this year I received a message that a blood-vessel had burst in the poll and the animal had

almost bled to death, but "that a pad of cobwebs and a bandage had eventually arrested the bleeding."

This with the consequent loss of appetite reduced the animal's condition. I removed the pad, cleansed the wound, and discovered a ragged wound at the base of horn, from which the bleeding had taken place, and could distinctly see the pulsation of a fairly large artery. I applied some Stockholm tar, and a pad of Petanelle wool, and bandaged it down, and all went well for a time; but early in September the horns were sent me with a message that the bleeding had recurred and the animal had bled to death, the stream of blood being of sufficient force as to form an arc backwards, falling on the cow's quarters.

The photograph shows clearly the deformed horn.

The horns were both detached at the base after death and boiled, so that it was impossible to make a histological examination. The horn core was very much enlarged, and contained cavities. It is probable that the condition was carcinomatous in origin. The size of the horn can be imagined from the following dimensions: The circumference of the diseased horn at the widest part measured 16 in., and the length along the greater curvature was 22 in. The normal horn only measured 6 in. at its widest circumference, and 10 in. along the greater curvature.

The accompanying photograph was obtained after the first hæmmorhage occurred.

Indexed B. A. L

SULPHUR POISONING IN HORSES.

Indexed B. A. L

By H. W. PERCY, M.R.C.V.S.
Chatteris, Cambs.

On Sunday, September 5, I was called out to attend some horses which were reported to me as being seriously ill. When I arrived at the farm I found that one of the animals had already died, another appeared in a very precarious condition, and several others were obviously ill. Suspecting that the animals were suffering from the effects of some irritant poison, I questioned the men, and elicited the following history :—

History.—It appears that it was usual on this farm to give each of the horses a dose of sulphur every Saturday night, to keep their blood in good condition, as the owner described it. On making enquiries I found that each animal was supposed to have about ʒii., but in reality they were given half a cake-tin of sulphur between every five horses, which on weighing worked out at something over ʒviii. each.

The sulphur was given in a dry condition mixed with chaff, oats, and beans. The horses were not tied up in the usual fashion when feeding, so that the horse which ate most food no doubt ate the most sulphur.

Symptoms.—The animal most affected appeared very dull and suffering great pain. The pulse was weak, quick, and easily compressed. Temperature 104° F.; respiration rapid and laboured; slight quivering of the muscles of the forearm; mucous membrane injected; difficulty in swallowing.

From time to time the animal passed some quantities of soft fæces of a clay colour. The urine was of a high colour; acid reaction; specific gravity 1040 ; contained albumin. On adding a solution of barium chloride to some urine to which a few drops of hydrochloric acid had been added to prevent precipitation of phosphates, a considerable precipitate of barium sulphate was thrown down. The following day the pulse was much weaker and respirations more laboured. Profuse diarrhœa of a very disagreeable odour, not unlike that of H_2S. Shreds of mucous membrane and sulphur could be detected in the fæcal discharge.

Treatment.—In order to control the irritation and get rid of the irritants, castor-oil, eggs and milk were given; for the pain chlorodyne, and for exhaustion Irish whisky. All the sick horses were treated alike and recovered.

Post Mortem on the Horse found Dead.—Intense inflammation of the stomach and intestines. Both organs contained a large quantity of

sulphur mixed up with the ingesta. I made a most careful examination of the contents of the stomach and intestines and a small portion of the liver, but failed to find the slightest trace of any other irritant poison. The sulphur was of a darker shade than usual, and of an acid reaction. On testing it showed the presence of sulphates and chlorides, but not of arsenic or calcium.

Action.—Sulphur when taken internally is partly absorbed from the intestines as the sulphide of an alkali. Its action is entirely due to the sulphide formed, sulphur itself being an inert substance. The portion absorbed is excreted as sulphate in the urine, which, no doubt, explains the considerable proportion I got with barium chloride when examining the urine. Its laxative action is generally accompanied by a most offensive odour of sulphuretted hydrogen, which is characteristic. The gas, I believe, is so freely generated and absorbed that it is capable of causing systemic poisoning. It is said that sulphur gives a disagreeable odour to the breath, but in the above case I failed to detect it.

Remarks.—The foregoing is only one of a number of cases of the kind which I have come across, and I am inclined to believe that it is more common than is supposed amongst the members of our profession. In the recent work on "Veterinary Toxicology," by J. A. Nunn, no mention of sulphur-poisoning is given.

From time to time I have been asked to attend cases of diarrhœa which has been brought about by the administration of sulphur by irresponsible persons. Not only is this drug poisonous to the horse, but, I believe, more common and more fatal in the pig. During the time I was professionally engaged by the Board of Agriculture, I met with numerous deaths wholly and solely due to overdosing with sulphur. My experience is that very few farm labourers have the bump of size and weight sufficiently developed. They have no idea of proportion; they cannot tell whether a thing is 2 oz. or 8 oz., and very often do not care.

In conclusion, I should like to say that I consider sulphur very poisonous if given in larger quantities than 8 oz. Small doses should always be administered the first time, as animals acquire a certain degree of immunity or tolerance to the drug. In nearly all the cases which come under my notice large doses of the drug had been given for the first time. Never give sulphur in large doses to an animal which has a tendency to scour as from worms, for when once diarrhœa has started it almost invariably proves fatal. I expect it is hardly necessary for me to warn the members of our profession of the

very dangerous explosions which occur when this drug is triturated with potassium chlorate. This may appear to some to be a small matter and often overlooked, but I regret to say that such careless handling has cost more than one life.

A MUMMIFIED FŒTUS.

By D. FORWELL, M.R.C.V.S.

Towcester.

On October 8, 1909, I was requested by a client, who breeds Jersey cattle, to go and see one of his heifers. When I arrived I found this heifer showing a piece of putrid placental membrane hanging from the vagina. I asked the bailiff when she had calved, and he said she had been put to the bull on November 5, 1908, but he said he thought she was barren. I made an examination *per vaginam*, but could find no trace of any calf, so I presumed she had already "slipped calf." I removed the placental membranes and gave her the necessary antiseptic injection to uterus. I heard no more of this case till November 10, 1909, when I was asked to see this same heifer, as she was discharging some filthy matter from the vagina. I again tried to make an examination of the uterus, but was quite unable to get my hand into the vagina, as she was so very small. I again gave her an antiseptic injection, and left an injection syringe and antiseptic to be used on her twice daily.

On November 13, 1909, at 9 a.m., I had an urgent message to go and see this heifer. On my arrival I found a small, hard mass showing in the vagina, the surrounding parts very much swollen, and the heifer straining very much. I fixed a steel hook into this mass (the head of a calf), and, after gentle traction for some fifteen minutes, abstracted a calf about the size of a fox-terrier. There was no hair or skin, and very little flesh left on this calf, and the skeleton was all more or less shrivelled up and partly calcified. The heifer, to my surprise, has never shown any "labour pains" of any description till Saturday morning, November 13, 1909, when I went and removed this calf. The heifer was "bulled" on November 5, 1908 (verified by books kept exactly), so she ought to have calved about three months or more sooner than she did. I have never known a cow carry a dead (or live) calf as long as this, and also it seems strange that the heifer should show little or no discomfort, as she fed well all the time. She is now quite all right again.

SUCCESSFUL TREATMENT OF STOMACH STAGGERS IN A CALF BY SOURED MILK.

By T. F. PRIME, M.R.C.V.S.
Norwood, S.E.

A few months ago a friend, who is a large dairyman and breeder of prize dairy cows, complained to me that he had recently lost several very valuable calves from stomach staggers, which he thought was due to overfeeding, these animals being hand-reared. He also stated that he had tried the usual treatments, but his results had been fatal. As there was always a lot of prepared soured milk on the premises for sale, I advised that the next case should be treated with soured milk. A few days later a very valuable calf who was being hand-reared was taken ill, and by my advice the owner commenced the treatment. This consisted of giving the calf instead of medicine or food only soured milk, in the same quantity and at the same intervals as the ordinary food had been given.

This treatment has been completely successful, whereas in the three previous calves attacked all treatment had failed. I ought also to mention that the one treated with soured milk appeared at first to be more depressed and ill than the previous ones. I certainly think that the treatment is worth of a further trial in stomach derangements of the calf, especially when accompanied by diarrhœa.

IMPERFORATE ANUS IN A CALF.

By P. S. MUNSHI, G.B.V.C.
Veterinary Surgeon, Manavadar.

I came across, in my practice, a case of a calf which was born with an imperforate anus. This is so comparatively rare that I hope it will be of some interest to the members of our profession. The history of the case is as follows:—

On October 2, a pure Gir Kathi cow, belonging to a farmer of this place, was delivered of a calf with an imperforate anus. To rectify this natural defect, and to make an artificial anal opening for the proper exit of fæces, the owner took it to a quack, who, however, operated at the wrong place. The result was that the calf could not get himself relieved of the impacted intestines.

When on the 5th the calf was brought to me for treatment in a somewhat comatose condition, I first got the wrongly operated part sutured up like an ordinary wound, and afterwards operated on the right place; thus the exit of the effete materials was facilitated by warm water enemas. The operated part was then treated like an ordinary wound, and the said calf can now pass its dung and fæces without the slightest inconvenience.

Canine Clinical Notes.

VACCINE THERAPY AND THE TREATMENT OF FOLLICULAR MANGE.

Indexed B. A. I.

By A. E. METTAM, B.Sc., M.R.C.V.S., &c.

Principal of the Royal Veterinary College of Ireland, Dublin.

The Editor has asked me to write a short note relating to the above subject. The treatment of follicular mange may be said, without fear of contradiction, to be far from satisfactory and more or less experimental. Many remedies have been suggested, but none are satisfactory, none give a majority of successes in a minimum of time. It may be that, as some of us believe, we have been too much influenced with the idea that the cause of the condition is the Demodex and have lost sight of the fact, if we ever appreciated it, that the lesion of the skin is due to the activity of a micro-organism causing suppuration. The extract published in the *Veterinary Record* of a paper by Professor Gmeiner, in the *Berliner Tierärztliche Wochenschrift*, induced me to give the results of vaccine treatment in a dog that I had under observation in the laboratory. The treatment had already commenced before the extract of the paper appeared, and before I was aware of Professor Gmeiner's opinions.

In follicular mange, if the lesions be examined small beads of pus may be readily expressed on slight pressure, and if this pus be examined there is little difficulty in discovering parasites in variable numbers. If a smear of pus be made and stained, say by Leishman's stain, there are also readily found numerous cocci, some free, others, not usually many, in the interior of leucocytes. The question then arises, is the lesion due to the demodices or to the cocci? Whether the demodices are the agents whereby the skin is injured and infection by these saprophytic cocci facilitated does not concern us now. Is the lesion a suppuration of the skin, and if we check the ravages of the causal agent can we arrest its spread? This is the question to solve, and upon its solution will depend the treatment. I had concluded from observation that the demodices probably had little to say in the development of the lesion, and that possibly the cocci were the cause; and I determined to try the effect of a vaccine prepared from the cocci isolated from the lesion of the animal under observation.

The animal is an Irish terrier, and the lesions extended over the whole of the head, front of the chest, and the limbs. The parts were almost denuded of hair, thickened, seething with pus, fissured, and

here and there suppurating sores. There was an intensely repellent odour; the conjunctivæ were covered with pus, and the animal in wretched condition. A portion of one limb was disinfected and a droplet of pus squeezed out; this was sown upon agar slants and the tubes incubated. Pure cultures of the *Staphylococcus pyogenes albus* were obtained and these reinoculated upon other agar tubes. The *S. pyogenes albus* appears to be the common cause of this form of suppuration. The vaccine is prepared as follows: The cultures grown upon agar are washed off with sterilized salt solution, and the suspension obtained is sterilized at 56° C. for an hour or an hour and a half. To make certain that the suspension is sterile tubes are inoculated from the suspension and incubated; no growth signifies sterility. The number of cocci in unit volume are counted, using one's own blood corpuscles as an index—*i.e.*, in a known quantity of blood, suspension and dilution used, we compare the numbers of corpuscles and cocci. We know the number approximately of red corpuscles in 1 c.mm. of blood, and then by a simple proportion sum we can estimate the number of cocci present in 1 c.mm., and multiplying this by 1,000 we have the number in 1 c.c. of fluid.

Before administering the vaccine it is usual to note the opsonic index of the patient's white blood corpuscles—that is, to note their phagocytic avidity. In cases of furunculosis, sycosis, and in suppurations generally, the opsonic index is low—that is, few cocci are phagocyted. In the treatment by vaccines the object is to increase the opsonic power, to stimulate the leucocytes to greater activity and greediness, and thus to cut short infection, limit invasion, and strengthen the natural defences. The opsonic index is reckoned in the following way: A quantity of blood is obtained from the patient; it is centrifugalized, and the serum obtained. Blood is obtained from another animal, preferably and in our case another dog, mixed with citrate of potash solution to decalcify the blood and prevent coagulation, and then centrifugalized. The precipitated corpuscles are washed with normal saline and again centrifugalized. This operation may be repeated several times, the object being to free the corpuscles from any serum of the normal dog. The white blood corpuscles are next taken, with an equal volume of suspension containing cocci and serum from the patient. The mixture is incubated at 37° C. in the opsonic incubator for half an hour and the mixture blown out and mixed upon a slide, and a film made and stained. A number of polymorphonuclear leucocytes, say 100, are counted, and the number of cocci phagocyted noted and an average struck. A parallel experi-

ment is made with leucocytes, suspension and serum of a normal dog. The results obtained from the normal dog's serum organisms and leucocytes may be taken as unity. It is usual to find that in the diseased animal the opsonic index is below normal, and if we reckon what was observed in the healthy control as 1 the patient's index on October 11 was ·4, on October 12, ·3.

In cases of follicular mange, I should like to point out that there is a temperature, due, without doubt, to the septic condition of the skin, and that we found, and find when the opsonic index is improving, that the temperature falls. After the vaccine has been injected a negative phase which is temporary succeeds and lasts a day or perhaps two, but it is followed by a rise in index, the positive phase, and it has been found in man that any vaccine injected during the negative phase is likely to do more harm than good. The dose of vaccine is regulated by the number of cocci injected and it is usual in the preparation of a vaccine to reduce the content of cocci to a suitable number, say 250,000,000 per cubic centimetre or some multiple.

On October 12, 500,000,000 cocci were injected into the subcutaneous fascia behind the left elbow, the temperature at the time being 103·4° F. On October 13 the temperature was 102° F.; the dog was lively. On October 14, it was 101·6° F., the animal in good spirits; the opsonic index had improved; the positive phase had been established. Sir Almroth Wright, to whom we owe most of our knowledge of this method of treatment, recommends that the lesions should be thoroughly soaked with a solution of 2 per cent. common salt containing ·5 per cent. citrate of potash. The object is to favour the flow through the parts of the lymph containing increased opsonins and that after the lymph has thoroughly soaked the parts that they be dusted with chalk containing 1 part of calcium chloride in 400. The animal was therefore thoroughly washed every day so far as the lesions were concerned with the above solution, and half an hour later the chalk powder was applied. The powder is to prevent escape of the opsonin-rich lymph and to produce coagulation of the lymph. I came to the conclusion, however, that the chalk powder, favouring as it did the formation of a dry scab, could be advantageously replaced by liquid paraffin, *paraffinum molle*, because the scab induced a certain amount of traction, upon parts irritation, and caused the animal to scratch. Scratching favours further infection. Later, therefore, the chalk powder was abandoned and the paraffin used. Its disadvantage is that it favours accumulation of dirt. The animal steadily improved in condition generally, the lesions improved, and the stench became

less. It is not unusual after an injection of vaccine to find a few new pustules make their appearance, but they usually abort and dry up in two days or so.

The temperature was taken daily, and I append it here :—

		°F.				°F.				°F.
Oct.	15	102·5	...	Nov.	2	102	...	Nov.	20	101
,,	16	102	...	,,	3	101·8	...	,,	21	100·5
,,	17	103	...	,,	4	101·5	...	,,	22	100·8
,,	18	102·1	...	,,	5	101	...	,,	23	101
,,	19	102·8	...	,,	6	101·6	...	,,	24	100·5
,,	20	102·8	...	,,	7	100·8	...	,,	25	101
,,	21	103·2	...	,,	8	101·4	...	,,	26	100·8
,,	22	103·4	...	,,	9	101	...	,,	27	101
,,	23	102·3	...	,,	10	101·2	..	,,	28	100·5
,,	24	102·4	...	,,	11	101	...	,,	29	101·1
,,	25	102·2	...	,,	12	101·5	...	,,	30	100·5
,,	26	102·6	...	,,	13	101·5	...	Dec.	1	100·2
,,	27	101·5	...	,,	14	101·3	...	,,	2	100·8
,,	28	102·5	...	,,	15	101	...	,,	3	100·1
,,	29	102	...	,,	16	100·4	...	,,	4	100·2
,,	30	100·5	...	,,	17	100·9	...	,,	5	101·1
,,	31	102	...	,,	18	101·6	...	,,	6	100
Nov.	1	101·5	...	,,	19	101·5	...	,,	7	100·7

On October 16 a fresh lesion appeared on the back, but, as above mentioned and as expected, it aborted. On the 18th another appeared about the shoulder towards the mid-line of the body. On the 19th the lesion aborted, and was dried up on the 21st. On the 18th 1,000,000,000 cocci were injected, and on the 25th a similar dose. Another lesion appeared on this day behind that of October 18, but it rapidly dried up and healed. The animal in the meanwhile was improving in general condition, and was in good spirits. The lesions about the head at the roots of the ears were troublesome, and the constant shaking of the head and the efforts of the animal to scratch parts caused me to change the chalk dressing for the emollient.

On November 1 the patient received a dose of 300,000,000, and on November 13 another of 1,000,000,000. On this date there were one or two small suppurating foci, and examination of the pus for demodices showed a few to be present. On November 16 an abscess formed above the nasal bones; it was the size of a hazel-nut; it was evacuated, and rapidly filled with granulations and healed. On November 22 there were only four small areas denuded of epidermis; these soon became covered, and at the end of the month the animal had completely recovered.

Since the original note was written the animal has continued to make good progress; the thickening of the skin is gradually dis-

appearing, the hair is growing; there has been no recurrence to date. He has had another dose of vaccine (1,000,000,000 cocci), prepared from another dog under treatment, on December 11 with the object of preventing any recurrence. In cases of furunculosis in man it has been observed that isolated lesions may develop some time after the patient has been declared free, and it is possible that our patient may also relapse, but up to the present (December 21) there is no sign of such.

The animal during the whole time he was in the laboratory had no other treatment than that described above. No dressings of any kind whatsoever was applied to his skin; in the words of the dresser, "He had not even carbolic soap rubbed on his skin."

The treatment has only been carried through in one patient, and I have no desire to claim that every case will be amenable to it, but I do desire to ask that it be followed where it conveniently can, and that the results be published in due course.

CONTAGIOUS VAGINITIS OF COWS.

By RICHTER.

RICHTER has treated this malady in twelve herds. Cure was considered complete when all the symptoms had disappeared, notably redness, tumefactions, and abnormal secretion of vaginal mucus. The most frequent results of contagious vaginitis are sterility, abortion, and stoppage or delay of parturition.

The twelve herds visited contained 501 animals, of which 351 were affected, or 70 per cent. Treatment was undertaken of 102 healthy subjects and of 315 affected ones. The therapy was bacillol pomade applied from four to six weeks, and 28·6 per cent. were cured.

(*Berliner Tierärztliche Wochenschrift.*)

THE WEEKLY REST OF VETERINARY SURGEONS.

THIS has been decided on by the Veterinary Society of Aube, in France. This rest shall be after mid-day on Sunday. If for an urgent case or simply by the insistence of the client it is necessary to make a visit or do any work whatever, a double charge shall be made; that is to say, a night fee. This experiment is interesting, and deserves to be followed.

(*L'Echo Vétérinaire.*)

Abstracts and Reports.

THE DRUG TREATMENT OF PIROPLASMOSIS IN CATTLE.[1]

By GEORGE H. F. NUTTALL, M.D., Ph.D., Sc.D., F.R.S.,
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AND
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Indexed B. A. I.

Introduction.—In a previous paper [2] we described experiments upon the curative and preventive treatment of canine piroplasmosis by means of trypanblau and trypanrot, and briefly stated that trypanblau exerts similar effects upon the bovine parasite to those observed in the case of *Piroplasma canis*. The object of this paper is to describe in detail our experiments upon the curative treatment of bovine piroplasmosis (red water or Texas fever) by means of trypanblau.

Our experiments on redwater were rendered possible through the help of the Colonial Office and of the Board of Agriculture and Fisheries. We are much indebted to H. J. Read, Esq., C.M.G., of the Colonial Office, for the kind interest he has taken in our work, and we take this occasion to thank Messrs. Stewart Stockman, M.R.C.V.S. (Chief Veterinary Officer of the Board), James R. Jackson, M.R.C.V.S., and W. G. Wragg, M.R.C.V.S., for the very friendly help they gave us during the prosecution of our experiments in the Laboratory of the Board of Agriculture and Fisheries at Alperton, Wembley, Middlesex.

History of the Strain of P. bovis *used in these Experiments.*—We are indebted to Mr. J. R. Jackson for the following particulars regarding the strain of South African *P. bovis* used for the inoculation of the cattle upon which we experimented:—

(1) *Initial Case.* On July 9, 1904, a calf, aged 3 months, was infested with *Boophilus decoloratus* larvæ obtained from South Africa. The calf did not develop symptoms, and no *P. bovis* were found in its blood. (Sir John McFadyean's case.)

(2) *Yearling Bull* 9 was inoculated April 13, 1905, with 5 c.c. of defibrinated blood taken from the initial case. The bull developed no symptoms, but a few *P. bovis* were detected in its blood on April 22, 1905.

(3) *Heifer* 5 was inoculated on December 2, 1905, with 5 c.c. of undefibrinated blood taken from the jugular vein of Bull 9. The heifer developed fever, and *P. bovis* were detected in its blood on December 11, 1905. The heifer suffered from severe piroplasmosis, but made a slow and steady recovery.

[1] (From *Parasitology*, vol. ii., No. 3, by special permission of Professor Nuttall.)

[2] Nuttall G. H. F. and Hadwen S. (1909), "The Successful Drug Treatment of Canine Piroplasmosis, together with Observations upon the Effect of Drugs on *Piroplasma canis*," *Parasitology*, vol. ii., pp. 156-191, 1 text-figure.

(4) *Heifer* 108 was inoculated September 5, 1907, with 50 c.c. of defibrinated blood from Heifer 5. The animal developed fever, and *P. bovis* were detected in its blood on September 13, 1907; the case was a severe one, but recovery was rapid.

With a view to assuring ourselves of the virulence of the strain maintained in Heifer 108 since September, 1907, two cows were inoculated by Mr. Stockman with its blood as follows:—

(5) *Cow* X was inoculated May 22, 1909, with 30 c.c. of defibrinated blood from Heifer 108, but having failed to react the cow was reinoculated after thirteen days with 200 c.c. of defibrinated blood from Heifer 108. The cow showed parasites on the sixteenth day after the first inoculation.

Cow 5 (which received treatment) was inoculated June 3, 1909, with 200 c.c. of defibrinated blood from Heifer 108, but having failed to react by the thirteenth day, the cow was reinoculated on June 15, 1909, with 30 c.c. of jugular blood taken two hours after death from our Control Cow I.

(6) *All of our remaining cows* (Controls I.-IV., Treated Cows 1-4), eight in all, were each of them inoculaed with 30 c.c. of defibrinated blood from Cow X on June 7, 1909. As will be seen by reference to their protocols all of these animals developed piroplasmosis.

As will be seen by reference to the foregoing record, the history of the strain starts with (1) *The initial case*, which was induced by means of infected ticks. This and the succeeding case, the first due to inoculation, ran a very mild course. The cases induced by subsequent inoculations (3 and 4, &c.) were severer.

The Cattle used for our Experiments.—The animals used in our experiments were purchased in the open market. In view of the limited means at our disposal, the cattle were of inferior quality. The majority were shorthorns, two were Jerseys. Cows IV. (Control) and 4 (treated) were in poor condition at the start. Excluding Cow X, with whose blood eight of the experimental animals were inoculated, we had nine animals at our disposal for the purpose of experiment. Of these animals four served as Controls and five were subjected to treatment.

Methods of Investigation.—The cows were in all cases inoculated subcutaneously with blood from the jugular vein of animals infected with *P. bovis*. In most instances the blood had been defibrinated prior to injection. The trypanblau was prepared in saturated watery solution (cold) and injected in quantities of 130 to 200 c.c. Four of the treated cows received the drug intravenously, whilst the fifth cow was treated subcutaneously.

The rest of our technique was precisely the same as that adopted in our experiments on dogs. Consequently, we refer the reader to our previous paper (particularly to p. 161), where we describe our method of enumerating the different forms of intracorpuscular parasites as recorded in the protocols.

In the blood counts which accompany all our protocols the percentage of infected corpuscles was usually determined by counting 500 consecutive corpuscles *along the middle* of the blood film, and

noting the number which harboured parasites. Where there were fewer than two infected r.b.c. per 500 counted, we estimated the percentage of infected corpuscles by the examination of successive "fields" each containing approximately the same number of corpuscles. The percentage of each class of parasite was usually determined by counting 100 consecutive infective corpuscles and classifying them according to the types of parasites which they contained. At times we counted 200 infected corpuscles for this purpose; at other times, where few parasites were present, we had to roughly base our percentage on smaller numbers.

Observations on Untreated Cattle.

The strain of *P. bovis* we used was not nearly so virulent as that of *P. canis*. Whereas all of our control dogs died from piroplasmosis only one out of four control cows died of red water. As will be seen, only two of the untreated cows had hæmoglobinuria. In both cases the urine was very heavily charged with hæmoglobin. One of these cows died of piroplasmosis.

Notes Regarding P. bovis.

Owing to certain differences in the morphology of *P. bovis* as compared to *P. canis* we have contented ourselves with a simpler classification of the types of *P. bovis* encountered in corpuscles. We omit to classify the single intracorpuscular pyriforms (P) separately, because many oblong, ovoid, or pyriform *P. bovis* occur which represent growing forms and not parasites which have quite recently invaded the corpuscles. This is in marked contrast to what is seen in *P. canis*, where the pyriforms soon become rounded after entering corpuscles. We therefore, in the case of *P. bovis*, include all single rounded, irregular, ovoid, or pyriform parasites under the sign (O). As in *P. canis*, the (O) and double pyriform parasites (PP) predominate in respect to numbers. On the other hand, dividing forms (D) occur more frequently and in greater numbers than in *P. canis*, which indicates that the process of division lasts longer in *P. bovis* than in the dog parasite.

Observations made by one of us (G. H. F. N.) on *P. bovis* in fresh blood maintained at 37° C. certainly indicate that the bovine parasite is less active than the canine both as to movement and rate of multiplication.

The signs, used in our protocols, have the following signification:—

The sign		stands for a corpuscle containing
(O)	...	1 rounded, ovoid, pyriform, or irregular parasite.
(PP)	...	2 pyriform parasites.
(D)	...	1 dividing form.

The brackets ( ) represent the corpuscle which contains the parasites.

The abbreviation *r.b.c.* stands for red blood corpuscle.

The sign + in the protocols denotes that the number of infected r.b.c., &c., was too small to determine the percentage.

The percentage of infected corpuscles in our untreated cattle never rose to the height observed in dogs. On the other hand, whilst the highest percentage of (D) encountered in dogs was 5 to 6 per cent., these forms at times occurred in 16 per cent. of the parasitized corpuscles in cattle. The following table summarizes the observations above-mentioned:—

Cow No.	The maximum per cent. of infected r.b.c. observed	The maximum per cent. of (D) forms observed	Hæmoglobinuria + present o absent
Cow X.	0·8	4	o
Control I.	5·0	13	+ (died)
,, II.	0·06	8	o
,, III.	0·2	16	o
,, IV.	4·6	14	+

That the percentage of infected corpuscles may occasionally be large is shown by the counts we made on blood films from Heifer 182. In this case 58·2 per cent. of the corpuscles contained parasites on the day it died. This animal had hæmoglobinuria.

Owing to the fact that we have included (P) forms under class (O) the percentage of the latter is usually in excess of the (PP) forms. The percentage of (PP) forms may, however, vary in individual cows at different times, as is shown in the following table :—

	Percentage of (PP) varied between
Cow X.	52 and 36
Control I.	48 ,, 33 (died)
,, II.	43 ,, 29
,, III.	38 ,, 16
,, IV.	48 ,, 31
Heifer 182	36 ,, 19·5
And before treatment in	
Cow 1	42 ,, 33
,, 2	52 ,, 41
,, 3	53 ,, 27
,, 4	37 ,, 33
,, 5	43 ,, 30

In all the untreated cases of red water which we have studied the (PP) forms were seen, as in dogs, to persist in the blood up to the death of the animals, or else they disappeared simultaneously with the (O) forms when the parasites vanished and recovery took place.

In our untreated cows the parasites were observable microscopically in the blood for four to six days, after which they could not be detected for two to eleven days.

	Parasites found microscopically in blood-films during	After which they disappeared for
Cow X.	4 days ...	11 days
Control I. (died) ...	4 ,, ...	— ,,
,, II.	5 ,, ...	8 ,,
,, III.	6 ,, ...	2 ,,
,, IV.	5 ,, ...	8 ,,

In all of the four cows which recovered naturally the parasites reappeared in very small numbers (only found at the edge or end of stained blood-films) on one or several days, as will be seen by reference to the protocols.

Observations on Treated Cattle.

The beneficial effects or trypanblau treatment in cattle are not as striking as in dogs, because the disease in the cattle upon which we experimented was much less fatal than that in dogs. Nevertheless, the curative effect is quite evident when we observe the action of the drug upon the parasites and upon the symptoms of the disease, and compare the data relating to the treated animals with those relating to the controls.

If we accept the presence of *hæmoglobinuria* as an indication of the severity of the disease, it follows that the cases chosen for treatment chanced to be severer, taken as a whole, than the group of cases chosen to serve as controls.

The Controls.—Hæmoglobinuria was observed in two out of the four controls; in Control Cow I. it followed twenty-four hours after the appearance of parasites, lasted three days and persisted until death; in Control Cow IV. hæmoglobinuria followed forty-eight hours after the appearance of the parasites and persisted for five days. In both cases hæmoglobinuria was severe. It is worthy of note that one of these two cows which had hæmoglobinuria died from piroplasmosis.

The Treated Animals.—All of the five treated animals had hæmoglobinuria, but recovered. In four the hæmoglobinuria appeared on the day the animal was treated, but before the injection of the drug. In one cow (No. 1) hæmoglobinuria was first noted twenty-four hours after treatment. The hæmoglobinuria was severe in Cows 3 and 4, marked in Cows 1 and 5, slight in Cow 2.

Hæmoglobinuria was noted in		Hæmoglobinuria lasted
Cow 1	48 hours after the parasites appeared	24 hours
,, 2	42 ,, ,, ,, ,,	1 day
,, 3	22 ,, ,, ,, ,,	5 days
,, 4	when the parasites were first found	36 hours
,, 5	49 hours after the parasites appeared	48 ,,

To repeat: Whereas one of the two controls which had hæmoglobinuria died of piroplasmosis, all of the five treated animals recovered, although they had hæmoglobinuria. In the untreated cows hæmoglobinuria lasted in one case three days, when the animal died; in the other case five days, when the animal recovered. In only one treated cow (3) did the hæmoglobinuria last five days; in the others it lasted only twelve, twenty-four, thirty-six, and forty-eight hours respectively.

The Effects of Trypanblau upon the Parasites.—The most striking proof of the efficacy of the drug is, however, afforded by the obvious effect it exerts upon the parasites. Exactly as in *P. canis*, the (D) forms are the first to disappear, then the (PP) forms, only the rounded or irregular forms (O) persisting for a time, whilst the percentage of infected r.b.c. falls rapidly. The effects of trypanblau are clearly set out in the following tables. Cow 5 received the drug subcutaneously, which accounts for the slower effect exerted upon the parasites.

BLOOD EXAMINATION BEFORE TREATMENT.

Cow	Maximum percentage of infected r.b.c.	Maximum percentage of (D) forms
1	0·8	8
2	1·0	8
3	1·0	11
4	0·6	3
5	1·5	6

N.B.—In none of the treated animals did the number of infected corpuscles exceed 1·5 per cent. In two out of four controls no less than 4·6 per cent and 5 per cent. of infected r.b.c. are recorded. In only one of the treated cows did the number of (D) forms attain 11 per cent. In three out of four controls, 13 per cent., 14 per cent., and 16 per cent. of (D) forms were recorded. These differences are attributable to the treatment.

TABLE SHOWING THE EFFECT OF THE DRUG IN REDUCING THE PERCENTAGE OF INFECTED CORPUSCLES WITHIN 4½ TO 8 HOURS AFTER TREATMENT AND CAUSING THE DISAPPEARANCE OF (PP) AND (D) FORMS.

Treated Cow No.	Showing effect of drug after stated time had elapsed	Percentage of infected r.b.c.		Percentage of (PP) forms		Percentage of (D) forms	
		At time when drug was given	After drug was given	At time when drug was given	After drug was given	At time when drug was given	After drug was given
1	4½ hours	0·8	·01	33	1	4	0
2	8 ,,	1·0	·03	41	1	8	0
3	4¾ ,,	0·6	·06	44	2	5	0
4	4½ ,,	0·6	·03	33	3	2	0
5*	7 ,,	1·5	·02	33·5	5·5	4	1

* This case was treated by subcutaneous injection. The effect of the drug is obviously less rapid.

After the periods of time noted in the above table, the blood was repeatedly examined for parasites. The results of these examinations are summarized in the following table.

TABLE SHOWING THE TIME WHEN THE COWS WERE TREATED AFTER THE PARASITES HAD FIRST BEEN FOUND, THE TIME WHICH ELAPSED BETWEEN THE INJECTION OF THE DRUG AND THE DISAPPEARANCE OF THE PARASITES, AND THE TIME WHEN THE PARASITES REAPPEARED AFTER THEIR FIRST DISAPPEARANCE.

Treated Cow No.	Time in days when cow was treated after parasites appeared	Time it took the parasites to disappear after drug was injected	Time when parasites reappeared
1	1 day	− 24 hours *	Blood negative for 18 days.
2	2 days	− 45 ,,	,, ,, ,, 16 ,,
3	1 day	− 24 ,,	,, ,, ,, 6 ,, Very few parasites found later, none on some days.
4	Same day	9 ,,	Blood negative for 5 days, 1 parasite found 6th day, none later.
5	2 days	− 45 ,,	Blood negative for 6 days, when observation ceased.

* The − signs before the numbers denote that the parasites may have disappeared some hours earlier than is recorded.

NOTE.—As will be seen by reference the parasites were found microscopically in the blood of the Control Cows during 4 to 6 days. The parasites reappeared after 2 days in one case, after 8 days in two cases, after 11 days in one case.

Judging from the facts above recorded, it appears certain that some of these cows would have died but for the treatment they received.

Note regarding Degenerative Changes in the Parasites.

The single parasites contained in infected corpuscles showed evidence of degeneration, as described in *P. canis*, in consequence of the treatment. When these single parasites were grouped according to their size into "large" and "small" we observed the following changes in their relative numbers as the result of treatment. (Examination of stained films from Cow 1):—

At 12.30 p.m., just before treatment there were 66% large and 34% small parasites.
,, 2.45 p.m., after ,, ,, 35% ,, 65% ,, ,,
,, 4.45 p.m., ,, ,, ,, 36% ,, 64% ,, ,,

After treatment, the large intracorpuscular parasites stained *faintly* in contrast to the small parasites, which stain intensely. At the same time a number of conjoined pairs of free pyriform parasites were observable, which stained faintly, and single degenerated pyriforms could be occasionally encountered.

Summary and Conclusions.

(1) Trypanblau promises to be an efficient remedy for bovine piroplasmosis, since it exerts a direct and obvious effect upon the parasites.

(2) The effect of the drug upon *P. bovis* is similar to that which it produces upon the canine parasite. The dividing forms are the first to disappear, and after a few hours the pyriform parasites also disappear from the peripheral circulation; the parasites which are detected in the blood after a few hours appear degenerated and rounded or irregular; within nine to forty-five hours or less all the parasites have disappeared from the blood.

(3) As in canine piroplasmosis the disappearance of the parasites from the blood may be temporary. The parasites also disappear and reappear in small numbers (after two to eleven days) in animals undergoing natural recovery. In three treated animals the parasites reappeared in exceedingly small numbers after five to six days; in two they had not reappeared after sixteen and eighteen days respectively. The animals show no symptoms and progress towards recovery.

(4) It remains to be determined (1) how long the blood of treated cows may contain parasites after the apparent recovery; (2) if the parasites in such recovered animals are altered in virulence; (3) if the parasites are capable of infecting ticks.

(5) The experiments were conducted on nine cows, of which four served as controls and five were treated with trypanblau. Of the controls two suffered from hæmoglobinuria, and one of these died of piroplasmosis; the two other controls had no hæmoglobinuria and were very mild cases. All of the treated cows had hæmoglobinuria and recovered. In four of the treated cows hæmoglobinuria occurred before treatment began.

(6) As might be expected, the drug exerts a more rapid effect when injected intravenously. The parasites disappear more slowly after subcutaneous injection of the drug. (Judging from our recent experiments on dogs, the giving of the drug *per os* promises to be without effect. See *Parasitology*, p. 231.)

(7) Although doses of 150 to 200 c.c. of a saturated watery solution of the dye were used, it is probable that smaller doses will prove efficient. The drug appears to produce no ill-effects upon cattle.

(8) The drug, being a dye, has the disadvantage of colouring the tissues, more especially the subcutaneous connective tissues. How long the colouration persists remains to be determined. In any case this disadvantage can scarcely weigh in the balance as against saving the life of the animal, especially when used for breeding purposes.

(9) We hope that experiments, which are about to be conducted in the field in Africa and elsewhere, will demonstrate the value of the remedy in practice.

(10) Trypanblau and similar drugs should be given a trial in the treatment of carçeag in sheep and biliary fever in horses.

Note regarding the Solubility of Trypanblau.

In the course of our experiments we noted that crystals of trypanblau were frequently deposited after a short time even in 1 per cent. solutions of the dye prepared with distilled water at room temperature. We therefcre communicated with the manufacturers who had supplied

us with the dye, Farbwerke vorm. Meister Lucius und Brüning, Hoechst a/M., desiring information regarding the solubility of trypanblau in distilled water. In a letter, dated August 3, 1909, from the manufacturers, the latter state that they have made many experiments in this direction, with the following results:—

One hundred cubic centimetres boiling water will dissolve 2 grm. of trypanblau and the solution can be easily filtered. On the other hand, 5 grm. of the dye will not easily dissolve in 100 c.c. of boiling water and the solution filters badly, part of the dissolved dye separating in the filter; on cooling, the solution forms a gelatinous mass. The 2 per cent. solution, after standing for twenty-four hours, has for the most part solidified into a gelatinous mass. In the case of 1 per cent. solutions only a very small amount of the dye separates out after the lapse of twenty-four hours. A ½ per cent. solution remains quite clear after standing for a long time. Owing to the difficulty of obtaining solutions of the dye, and the tendency of the solutions to gelatinize on standing, it appears advisable to prepare the solutions immediately before use, in which case a 2 per cent. solution at blood temperature could be used.

As stated we prepared our solutions in the cold, the dye being added in the proportion of 1 to 1·5 per cent. to distilled water. Our solutions did not gelatinize, and there was always a certain amount of dye deposited. The deposit was fine and was mostly taken up in the syringe and injected with the solution. From a practical standpoint the 1 per cent. solution appears to suffice, and further experience may show that ½ per cent. solutions are sufficiently effective.

G. H. F. N.

Miscellaneous.

UNIVERSITY OF LONDON.

Intermediate Examination in Veterinary Science (Part II.), for External Students.

Pass List, 1909.

1801. Graves, Thomas Chivers, M.R.C.V.S., Royal Veterinary College.
1802. Sheather, Alfred Leslie, M.R.C.V.S., Private study.

Examiner: Veterinary Physiology: Professor W. D. Halliburton, M.D., LL.D., B.Sc., F.R.S.

B.Sc. Examination in Veterinary Science for External Students.

Pass List, 1909.

1901. Andrews, William Horner, M.R.C.V.S., Royal Veterinary College. Institut Pasteur, Paris, and Ecole Vétérinaire, Alfort.

Examiners: Veterinary Hygiene: S. Stockman, Esq., M.R.C.V.S.; Veterinary Pathology: W. Bulloch, Esq., M.D., C.M.

ROYAL COLLEGE OF VETERINARY SURGEONS.

Examinations in London.

At a meeting of the Board of Examiners held in London on December 13, 1909, for the written, and on and between December 17 and 20 inclusive for the oral and practical examinations, the following passed their final examination and were admitted members of the Royal College of Veterinary Surgeons:—

Mr. T. A. B. Cocksedge
,, V. S. M. Cope
,, A. A. Comerford
,, V. Franklin
,, J. P. Hamilton
,, W. D. John
Mr. F. O. Maynard
,, J. A. McMenamin
,, V. Pride Jones
,, W. Sewell
,, P. R. A. Thrale
,, P. R. Thompson

The following passed their third examination:—

Mr. J. A. G. Gosling
,, S. G. M. Hickey*
,, S. C. Rowbotham
Mr. G. A. Roberts*
,, R. Wooff*
,, R. Wynne Williams.

The following passed their second examination:—

Mr. F. G. Buxton
,, R. T. Davis
,, T. Herratt
,, E. J. Lainé*
Mr. W. F. Poulton
,, S. H. L. Woods
,, B. M. R. West*

The following passed their first examination:—

Mr. C. E. W. Bryan
,, C. J. R. Lawrence*
,, W. E. Petty*
,, R. J. Stow
Mr. S. L. Slocock*
,, J. S. Watson
,, H. B. Williams

Marked thus * passed with Second Class Honours.

Examinations in Dublin.

At a meeting of the Board of Examiners held in Dublin on December 13, 1909, for the written, and on December 14 for the oral and practical examinations, the following passed their final examination:—

Mr. C. Armstrong
,, J. A. Gibbons
,, M. F. O'Sullivan
,, H. G. Tabuteau-Herrick
Mr. T. G. S. Bogue
,, J. Dodd
,, W. T. Ferguson
,, J. Fox

The following passed their third examination:—

Mr. C. H. Bryans
,, P. A. Carroll
,, M. Cunningham
,, E. Wilson
,, T. Doyle
,, C. A. Kelly
Mr. P. F. McCormack
,, T. L. Revington
,, F. Roche
,, J. A. Smith
,, F. J. Weir*

The following passed their second examination:—

Mr. R. Burriss
,, J. Evans
,, V. Fox
,, T. H. Kellett
,, C. E. McCrea
,, R. Marner
,, W. J. O'Donoghue*
Mr. A. E. O'Neill
,, C. J. Ryan
,, W. P. Walsh
,, R. P. Byrne
,, J. R. Jackson
,, L. C. Maguire
,, L. J. Kelly

The following passed their first examination :—

Mr. T. J. Carroll *	Mr. J. Shannon
,, S. Flood *	,, A. E. Brandon
,, L. A. Herbert	,, E. S. Morgan
,, P. D. Huston	

Marked thus * passed with Second Class Honours.

EXAMINATIONS IN LIVERPOOL.

At a meeting of the Board of Examiners held in Liverpool on December 13, 1909, for the written, and on and between December 16 and 20 inclusive for the oral and practical examinations, the following have passed their final examination :—

Mr. C. L. O'Gorman	Mr. E. Morgan

The following passed their third examination :—

Mr. P. McGregor	Mr. E. L. Butters *
,, F. J. Richmond	

The following passed their second examination :—

Mr. W. Atkinson	Mr. A. L. Pollard
,, H. D. Lewis	,, J. L. Williams
,, W. Andrews *	

The following passed their first examination :—

Mr. A. P. Gately	Mr. R. Daubney

Marked thus * passed with Second Class Honours.

EXAMINATIONS IN GLASGOW.

At a meeting of the Board of Examiners, held on December 13, 1909, for the written, and on December 15 and 16 inclusive for the oral and practical examinations, the following passed their final examination :—

Mr. M. Mackay	Mr. J. J. O'Brien
,, J. F. Taylor	

The following passed their third examination :—

Mr. J. Dunlop	Mr. J. S. Moncrieff
,, H. M. Johnston	,, W. S. Inglis
,, W. Anderson	

The following passed the second examination :—

Mr. W. Macfarlane.

The following passed their first examination :—

Mr. E. F. Angler	Mr. R. B. Crichton
,, W. Barr	

EXAMINATIONS IN EDINBURGH.

At a meeting of the Board of Examiners, held on December 13, 1909, for the written, and on and between December 15 and 18

inclusive for the oral and practical Examinations, the following passed their final examination :—

Mr. J. Anderson	Mr. F. H. Sanderson
,, W. Davies	,, J. J. Soutar
,, J. Macfarlane	,, J. Waddell
,, E. J. Nicholson	,, W. Walker

The following passed their third examination :—

Mr. W. Aitken	Mr. J. B. Idle
,, H. Allison	,, W. S. Lornie
,, J. L. Cormack	,, W. J. McKenzie
,, S. C. Currie	,, P. B. Riley
,, J. R. Greig	

The following passed their second examination :—

Mr. F. J. L. Croudace	Mr. W. Dalling *

The following passed their first examination :—

Mr. R. E. Drennan	Mr. W. K. Denham
,, J. B. Russell	,, E. Sewell
,, D. R. Williamson	,, E. S. Holmes *

Marked thus * passed with Second Class Honours.

ROYAL COLLEGE OF VETERINARY SURGEONS.

Fellowship Degree.

A meeting of the Board of Examiners for this Degree was held on December 11, 1909, at 10, Red Lion Square. Eight candidates entered for the examination, and the undermentioned gentlemen passed and obtained the diploma :—

Candidates	Title of thesis
Bennett, R.	"Anthrax."
Trigger, Wm.	"Laminitis."
Amos, S. T.	"East Coast Fever."
Runciman, T., jun. ...	"Joint Evil in Foals."
Moody, W. J.	"Phosphorus and Arsenic Poisoning in Herbivora."

The examiners were Messrs. J. Malcolm, W. Hunting, and Professor Macqueen, Mr. W. J. Mulvey being in the chair.

THE ROYAL SANITARY INSTITUTE.

At the examination held on December 10 and 11, 1909, thirty-six candidates presented themselves, and sixteen were granted certificates, including :—

Mr. J. B. Buxton, M.R.C.V.S.
,, G. W. Dunkin, M.R.C.V.S.
,, B. H. Mellon, M.R.C.V.S.

Translations.

A CASE OF FLAT EPITHELIAL CANCER ON THE LOWER JAW OF A HORSE.

By Chief Veterinary-Surgeon JAHNICHEN.

Hitherto it has generally been accepted that carnivora frequently suffer from cancer and herbivora not at all, but this view in recent times has been shown to be erroneous. It has been found that plant-eaters suffer from carcinoma (more frequently from sarcoma), and that old or adult animals are generally affected. The occurrence of carcinoma as affecting the horse is shown by the accompanying statistical information.

According to Schütz from observations published in the year 1902, among 126,776 (in a period of twelve years) horses examined fifty-eight cases of cancer were found. Consequently in each 10,000 horses there were about four cases of cancer. Of these fifty-eight discovered cases forty-eight involved the skin, seven the vagina and uterus, and three the large cavities of the head. In eighteen years 3,877 horses were examined *post-mortem*, of which six were found to have carcinoma. In literature from a hasty compilation 245 cases of cancer have been recorded. In the apportionment of primary cancer eighty-six of these involved the skin, sixty-five the urino-genital organs, twenty-five the digestive apparatus, and sixty-nine the respiratory tract.

Fröhner in the course of a year operated on forty-seven horses for tumours; of these, three were carcinomatous, and Johne found twenty-eight cancers in 128 horses operated on for tumours.

At the Pathological Institute of the Veterinary College at Dresden, five cases of carcinoma affecting the head of the horse have been noted in the last ten years. Sixteen carcinomas have been met with in the clinic of the Veterinary College in Berlin in fifteen years—five of the nasal cavities, eight of the upper jaw, and three of the brain and nasal cavities. The cavities of the jaw, the conjunctivæ, and the lymphatic glands are the favourite places of attack.

Casper found three cases of cancer of the upper jaw, Frohner records two cases of flat epithelial cancer of the upper jaw, an alveolus being attacked in one case and the hard palate in the other. Poppe describes two cases of flat epithelial cancer of the third eyelid of the horse, and Fröhner and Möller mention such cases. Hinrichsen encountered a case of primary cancerous growth (carcinoma medullare) of the lymphatic glands of the head, with metastatic extension into the liver and kidneys. Dammaun saw a flat epithelial carcinoma affecting the gums and upper incisors of a horse aged 15.

I can find no record of the occurrence of the neoplasm involving the lower jaw of a horse, but the following case which I encountered is undoubtedly one:—

At the beginning of January I was called to a horse which had eaten badly for fourteen days. He was a big, bony, saddle horse, aged 14. He stood with sunken head, his food half eaten, and saliva sodden; he had a listless gait and long staring coat. On the right side of the larynx there was an uneven—not painful and not hot—swelling of cartilaginous consistence, and from a fistula canal about

3 cm. deep, surrounded by wall-like granulations, a yellow, creamy, evil-smelling pus escaped. Neither the swelling nor skin over it was moveable. The right masseter was œdematous, but not painful on pressure. There was an evil-smelling discharge from the right nostril. There was no abnormal smell of the breath. Water was taken freely, but food taken into the mouth could not be swallowed. The mouth could only be opened about three fingersbreadth, and a bad smell similar to that from carious teeth issued from it. Treatment was purely symptomatic. In the course of the following week on the right and left of the larynx and extending into the masseter about twenty different large abscesses formed, from which yellowish clear tenacious pus and dark sanguineous fluid escaped.

Guinea-pigs inoculated with some of this fluid died of catarrh of the stomach after six weeks, but showed no changes either at the inoculation place or in the internal organs. Agglutination tests for glanders gave no result. The horse gradually sank to a skeleton, and died on February 3.

Post-mortem.—Badly nourished cadaver. Rigor mortis not general. In the œsophagus and on the right cheek irregular, torn, and discoloured granulations. Spleen enlarged and pulp very dark red; kidneys full of blood; liver enlarged and rounded edges, on the anterior surface of the liver capsule, hard sinewy appendages and greyish-white opague spots as large as a mark piece. On the gums at the dorsal edge of the right lower jaw behind the third molar there was a prominent, knotty, new formation, as big as a hen's egg, of soft consistence and dirty greyish blue colour. Its surface was covered with smeary, necrotic, bad-smelling masses. The roots of the tumour had grown through the whole of the under jaw and broken through its ventral edge. The submaxillary glands were enlarged, and their cut surface showed speckly-grey points and large and small cavities filled with pus. Further, metastasis could not be found. No anomalies of the teeth. The tumour, examined by Dr. Joest, of the Dresden College, was pronounced to be a typical flat epithelial carcinoma, with sarcoma tissue between the cancer cell nests—a so-called carcinoma sarcomatodes.

(*Zeitschrift für Veterinärkunde.*)

A CASE OF ARSENIC POISONING IN THE DOG.

By Sub-Veterinary-Surgeon Dr. ROELCKE.

At the beginning of April a fox-terrier was brought to me by his owner, who said he had picked up an unknown quantity of white powder which had been strewn about the house as a mouse poison, but according to the sellers this powder was quite harmless to men and animals. The dog had become very restless on the evening of the preceding day and made violent attempts at vomiting and foamed at the mouth. After some time he was quieter, sought out his usual resting-place, laid down and seemed much better. Early the following morning, as the dog could not get up the owner called in the veterinary surgeon.

Examination showed 130 pulse-beats a minute, weak impact of the heart, cold extremities, dirty red coloration of the visible mucous membranes. Breathing 35 to the minute and laboured. Diarrhœa not present; pupils dilated. The animal lay listlessly and would not get up or raise himself on his forelegs.

The suspected powder contained plainly visible porcelain-like scales which were mixed with powdered sugar. By heating the substance in question with potassium acetate the characteristic smell was given off.

The diagnosis from clinical and chemical examination was one of arsenic poisoning. The treatment consisted of *antidotum arsenici*, a teaspoonful every four hours. In the course of twenty-four hours the dog completely recovered.

(*Zeitschrift für Veterinärkunde.*)

CHONDROMA OF THE HUMERUS IN A COW.

By M. EISENMENGER.

Veterinary Surgeon in 12th Chasseurs.

Normandy cow, aged 8, presented at the abattoir of Pont sur Meuse for sanitary inspection. This cow presented at the level of the left shoulder an oval, painless, hard, sessile tumour, whose large axis was directed from above to below. The skin covering it was not thickened, and was free from any lesion.

The tumour reached from the upper third of the scapula to the middle of the humerus, and from the articulation of the shoulder to 4 or 5 cm. behind the posterior border of the scapula. It occasioned no inconvenience in walking.

At the autopsy the neoplasm is surrounded by thickened conjunctive tissue. The supra and sub-spinous muscles were easily isolated from it, and it was only separated from the articular scapulo-humeral capsule by layers of connective tissue. It was firmly fixed to the deltoid cavity of the humerus with which it was incorporated. The tumour is of cartilaginous nature, and is formed by little nuclei of cartilage, situated in the middle of the conjunctive network; this tissue becomes denser in proportion as it approaches the humerus, and little by little is transformed into bone towards the point of its attachment.

The vertical axis of the tumour measures 43 cm., the antero-posterior measures 36 cm. The weight is 9 kgram. 365 grm.

This chondroma appears to be of traumatic origin. A kick or a thrust with a horn received at the level of the deltoid cavity of the humerus has inflamed the periosteum (the skin had not been injured); cartilage was formed in abundance by the inflamed bone, and little by little this new tissue had a tendency to change into bone. At a relatively near time the chondroma would have become an osteoma. This case is interesting on account of its rarity, and the large size of the tumour.

(*Revue Générale de Médecine Vétérinaire.*)

Medicinal Preparations.

FIBROLYSIN AND TANNOFORM.

We have received from Mr. E. Merck samples of tannoform and fibrolysin for purposes of trial. The fibrolysin is a clear, colourless solution put up in neat sterile glass ampullæ. It is a soluble substitute for thiosinamine, and it is stated that it can be used without ill-effects either subcutaneously, intramuscularly, or intravenously. It is claimed for it that it permanently reduces inflammatory fibrous tissue, and is consequently indicated in such cases as strictures, fibrous tumours, and fibrous adhesions of serous membranes. We have not yet been able to give the agent a satisfactory test, but we hope to do so in the near future, and to communicate the result.

Tannoform, on the other hand, is an agent with which we are already familiar. It is a light reddish-white powder, odourless and almost tasteless, insoluble in water, but soluble in alcohol. It is a condensation product of tannic acid and formaldehyde, and combines to some extent the action of both those drugs. We have had very good results from its use externally as a dusting powder for superficial wounds in various species of patients, and for moist eczema in dogs. We have also had excellent results from its internal use in canine practice in the treatment of various forms of diarrhœa, including the abdominal form of distemper, in doses of gr. v. three times daily, administered as a powder.

Books and Periodicals, &c., Received.

The Englishman; Journal of the Incorporated Society for the Destruction of Vermin; Report of the Principal Veterinary Surgeon and Bacteriologist for Queensland; Bureau of Animal Industry, U.S.A.; Bulletin of the Sleeping Sickness Bureau; The Strange Story of the Dunmow Flitch (D. Carter, Dunmow); Bacon Curing in Essex (L. M. Douglas); London University Gazette.

Letters and Communications, &c.

Professor Mettam; Mr. S. Dodd; Mr. L. M. Douglas; Mr. T. Runciman; Mr. Merck; Board of Agriculture and Fisheries; Department of Agriculture and Technical Instruction for Ireland; Mr. F. O. L. Walpole.

Note.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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